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The Pricing Strategy and Risk Management of Financial Leasing --A Case Study of the New Energy Vehicle Business

YANG Lvzhou

Doctor of Management

Supervisors:
PhD Diana A. Mendes, Associate Professor,
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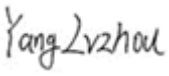
Signed:  Date: 2021.12.31

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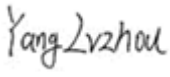
作者签名：  日期：2021.12.31

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Abstract

Financial leasing, an innovative financial product that combines trading, financing and leasing, has become one of the five pillar industries of the global financial market. After more than 30 years' development in China, financial leasing has improved in terms of enterprise number, business amount, legal policies, market environment. However, due to the complexity of the financial leasing industry, irregular operations and immature markets are accompanied by certain risks. Faced with the environmental issues and the "green" trend, new energy vehicle has attracted attention worldwide. In China, the government has issued a series of measures and subsidies to promote the new energy vehicle industry. As a result, the production and sales of new energy vehicles have greatly increased and the financing leasing business of new energy vehicles has rapidly developed. At present, the overall penetration rate of China's auto finance is about 38%, among which the financial leasing only constitutes 2%. The financing leasing business of new energy vehicles is still in its infancy, so the market is large. However, there are risks in the financial leasing business of new energy vehicles, including financial risks and environmental risks.

This thesis takes the new energy vehicle financial leasing business of SQ Company as a research case. Based on reading and analyzing the literature, this thesis divided the risks of the company's new energy vehicle finance leasing business into financial risk and environmental risk, and used CAMELS model to comprehensively evaluate the risks. After analyzing the risks, this thesis put forward the coping strategies of risk problems and risk transfer measures based on pricing strategies. Among them, the coping strategies include diversified business income, innovative business models for new energy vehicle financing leasing, and improvement of the company's risk management system.

Keywords: new energy vehicles; financial leasing; risk management; pricing strategy

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Resumo

O leasing financeiro, é um produto financeiro inovador que combina negociação, financiamento e leasing, e que ultimamente tornou-se um dos cinco pilares da indústria do mercado financeiro global. Depois de mais de 30 anos de desenvolvimento na China, o leasing financeiro melhorou em termos de número de empresas a adotar este negócio, o valor do negócio, as políticas legais, o ambiente de mercado. No entanto, devido à complexidade da indústria de leasing financeiro, as operações irregulares e os mercados imaturos são geralmente acompanhados por certos riscos. Tendo em consideração as questões ambientais e a tendência "verde", os veículos movidos por novas energias, têm despertado a atenção dos clientes em todo o mundo. Na China, o governo emitiu uma série de medidas e subsídios para promover a indústria de veículos baseados em novas energias. Como resultado, a produção e as vendas de veículos de novas energias aumentaram bastante e o negócio de leasing financeiro dos mesmos teve um desenvolvimento rápido. Atualmente, a taxa de inserção geral do financiamento de automóveis da China é de cerca de 38%, entre os quais o leasing financeiro constitui apenas 2%. Assim, o negócio de leasing financeiro de veículos de novas energias ainda está em sua infância, sendo o mercado disponível neste sector bastante amplo. No entanto, existem riscos no negócio de leasing financeiro de veículos de novas energias, incluindo os riscos financeiros e ambientais.

Esta tese considera o negócio de leasing financeiro de veículos de novas energias, da *SQ Company*, como um caso de estudo. Com base na leitura e na análise da literatura científica, esta tese dividiu os riscos do leasing financeiro de veículos de novas energias em risco financeiro e risco ambiental, e usou o modelo CAMELS para avaliar de forma abrangente os riscos. Depois de analisar os riscos, esta tese apresentou as estratégias para encarar os problemas de risco e as medidas de transferência de risco com base em estratégias de preços. Entre elas, as estratégias de combate ao risco incluem receitas de negócios diversificadas, modelos de negócios inovadores para o leasing de financiamento de veículos de novas energias e melhoria do sistema de gestão de risco da empresa.

Palavras-chave: veículos baseados em novas energias; leasing financeiro; gestão de risco; estratégia de preços

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摘要

融资租赁作为一种结合了贸易、融资、租赁多种交易行为的创新金融产品，已然成为了全球金融市场的五大支柱之一。融资租赁在我国经过了 30 多年的发展，无论是在企业数量、业务总量方面，还是在法律政策、市场环境等方面都有较大的改善和提高，同时由于融资租赁业本身的复杂性、运行的不规范和市场的不成熟等，其始终伴随着一定的风险。另外，在环境问题日益突出，绿色发展日渐成为现实的大背景下，新能源汽车的发展也受到了全球各国的重视。我国相关政府部门出台了一系列措施和补贴来促进新能源汽车产业的发展，其产销量在近几年也得到了较大幅度提高，新能源汽车的融资租赁业务也随之而得到了发展。我国汽车金融的整体渗透率目前约为 38%，其中融资租赁仅有 2%，新能源汽车的融资租赁业务还处于起步阶段，还有巨大的市场空间。但是，新能源汽车的融资租赁业务也存在着风险，主要包括财务风险和环境风险。

本文以 SQ 公司的新能源汽车融资租赁业务为研究案例，在阅读、分析大量文献的基础上，将公司新能源汽车融资租赁业务的主要风险划分为财务风险和环境风险，并用 CAMELS 模型对其风险进行全面性评价。在分析风险的基础上，提出了风险问题的应对策略和基于定价策略的风险转移措施，其中应对策略主要包括多元化的业务收入、创新新能源汽车融资租赁的业务模式、完善公司风险管理体系等。

关键词：新能源汽车；融资租赁；风险管理；定价策略

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Acknowledgements

By the time when this thesis is about to be completed, I would like to sincerely thank my Portuguese supervisor, Professor Diana, who is concerned about the development of China's financial leasing industry and the new energy vehicle industry, and is an expert in the study of financial leasing. Professor Diana is rigorous, knowledgeable, and insightful in research, sincere and enthusiasm in life. Learning from Professor Diana not only enriched my knowledge and improved my academic research capability, but also cultivated my systematic thinking ability and gained me precious friendship.

I would also like to give credit to my Chinese supervisor, Professor Li Yajing, who is an experience scholar in the field of corporate finance and capital markets in UESTC. Professor Li has played a vital role in my research. During the thesis writing, Professor Li sacrificed many weekends to give guidance to my thesis. From choosing the research topic to the thesis writing, from the thesis framework to the thesis details, Professor Li has given valuable advice and patient guidance. Professor Li not only cares about the completion of my thesis, but also organizes research group meetings regularly to let us make progress together through sharing the problems encountered during the thesis writing, learning from each other, and encouraging each other. Thanks to the selfless dedication of Professor Li and the encouragement of my colleagues in the research team, my research was successfully completed. I would like to express my heartfelt thanks again.

I am also very grateful to the professors and teachers in UESTC and ISCTE. They are Professor Xiao Wen, Professor Virginia...

I would also like to thank the leaders of the Risk Management Department, the New Energy Commercial Vehicle Division, the Internet Center, and the Post-loan Management Center of SQ Company. They spared time to accept my interview when I was collecting research materials, which provided valuable assistance for my thesis.

Last but not the least, I would like to thank my family for their tolerance, care and support, so that I can have time and energy to complete the phD courses and the thesis.

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致谢

在此论文完成之际，我首先要真心地感谢我的葡方导师戴安娜教授。戴安娜教授非常关注中国融资租赁行业和新能源汽车行业的发展，是研究融资租赁方面的著名专家。戴安娜教授不仅在学术上治学严谨、知识渊博、见解独到，在待人接物上更是真诚热情，不仅丰富了我的知识，提高了我的学术研究能力，还培养了我系统的思考能力，也收获了宝贵的师生情谊。

同样，我也要诚挚地感谢我的中方导师李亚静教授。李亚静教授是电子科技大学经济与管理学院在公司金融 资本市场领域，李亚静教授具有深入的研究，这对我的课题研究起到了至关重要的引导作用。在我的论文撰写期间，李亚静教授教授多次放弃难得的周末休息时间，对我的论文进行悉心指导，从开题到撰写、从框架到细节都离不开李亚静教授教授的宝贵意见和耐心指导。李亚静教授教授不仅关心我的论文完成情况，还定期开展小组科研会议，让大家交流论文完成过程中遇到的问题，彼此学习相互鼓励共同进步，正是得到了李亚静教授的无私付出与指导，得到了科研小组同伴的交流与鼓励，我的论文才得以顺利完成，再次表示衷心的感谢。

另外，我也非常感谢电子科技大学经济与管理学院和葡萄牙里斯本大学学院的众多教授和老师们。他们是肖文教授、Virginia 教授

然后，我还要感谢 SQ 狮桥租赁公司风险管理部、新能源商用车事业部、互联网中心和贷后管理中心的领导们，在我为论文收集资料之际，他们放弃了宝贵的休息时间接受了我的访谈，也为我提供了宝贵的资料，让我论文得以顺利完成。

最后，我要特别感谢我的家人，正是有了他们的包容、关心和支持，使得我有足够的时间和精力去完成博士课程的学习和论文的研究。

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Chapter 1: Introduction

1.1 Research background

Although the financial leasing of new energy commercial vehicles such as hybrid electric vehicle (HEV) and battery electric vehicle (BEV) is an emerging business in China, it has developed rapidly in the past few years. Taking SQ company as a case, this study firstly analyzed the company's financial leasing of new energy commercial vehicles, then discussed the company's pricing strategy and risk management. The following section would discuss about the research background.

1.1.1 The market and policy of China's new energy commercial vehicles

1.1.1.1 China's new energy commercial vehicle market

According to the *Report of China's New Energy Vehicle Market and Strategic Investment Planning* (Forward Industry Research Institute, 2018), the production and sales of new energy commercial vehicles in 2018 reached 1.270 million and 1.256 million, respectively. Compared with 2017, the growths are 59.9% and 61.7%, respectively. For battery electric vehicles, the production in 2018 was 986,000, with the growth being 47.9% compared with 2017, and the sales in 2018 was 984,000, with the growth being 50.8% compared with 2017. For plug-in hybrid vehicles, the production in 2018 was 283,000, with the growth being 122% compared with 2017, and the sales in 2018 was 271,000, with the growth being 118% compared with 2017.

Meanwhile, according to the *Forecast Report of Investment Potential and Market Scale of China's New Energy Vehicle Industry in 2020-2026* (Zhiyan Consulting, 2020), in 2019, the production and sales of new energy commercial vehicles were 1.242 million and 1.206 million, respectively, with the decline being 2.3% and 4.0% compared with 2018. For battery electric vehicles, the production was 1.02 million, with the growth being 3.4% compared with 2018, and the sales was 972,000, with the decline being 1.2% compared with 2018. For plug-in hybrid electric vehicles, the production was 220,000, with the decline being 22.5% compared with 2018, and the sales was 232,000, with the decline being 14.5% compared with 2018. For fuel cell vehicles, the production was 2,833, with the growth being 85.5% compared with 2018, and the sales was 2,737, with the growth being 79.2% compared with 2018.

1.1.1.2 Policy on the promotion and application of new energy commercial vehicles

In 2016, the Ministry of Finance, the Ministry of Science and Technology, the Ministry of Industry and Information Technology, and the National Development and Reform Commission announced the *Notice on Adjusting the Fiscal Subsidy Policy for the Promotion and Application of new energy commercial vehicles [2016] No. 958*. The *Notice* pointed out that, from January 1st, 2017, the subsidy standard of new energy commercial vehicles will be adjusted and improved under the premise that the subsidy policy remains stable from 2016 to 2020. For new energy buses, the power battery will be the core of the subsidy, with the technical progress and the production cost of the battery being the accounting criteria. For new energy trucks and special purpose vehicles, the subsidy standards will be further improved, with the grading and regressing mode of driving battery being the accounting criteria. Meanwhile, the upper limits of central subsidies and local subsidies are set separately: The total amount of local financial subsidies for each vehicle shall not exceed 50% of the major financial subsidies. Except for fuel cell vehicles, the subsidy standards and upper limits for all vehicles should decrease by 20% based on the current standards.

In 2020, the Ministry of Finance, the Ministry of Science and Technology, the Ministry of Industry and Information Technology, and the Development and Reform Commission jointly issued the *Notice on Improving the Fiscal Subsidy Policy for the Promotion and Application of new energy commercial vehicles [2020] No. 86* (hereinafter referred to as *Notice*). The *Notice* pointed out that: 1). The subsidy period should be extended, and the intensity and pace of subsidy decline should be smoothed. The subsidy standard for 2020-2022 will be reduced by 10%, 20%, and 30% based on the previous year; 2). New business models such as vehicle and electricity separation should be supported. Enterprises should be encouraged to further improve the safety and reliability of vehicles and develop and produce new energy vehicle products with advanced underlying operating systems, electronic and electrical system architectures, and intelligent networking features; 3). From 2020 on, for new energy passenger vehicle companies and commercial vehicle companies, the number of vehicles should respectively reach 10,000 and 1,000 in a single declaration for liquidation; 4). The price of new energy passenger vehicles must be less than ¥300,000 before subsidies (including ¥300,000).

1.1.1.3 The promotion of new energy commercial vehicle financial leasing

From the market performance and promotion policy of new energy commercial vehicles, we can observe the following: on the one hand, China's new energy commercial vehicles have a good prospect and a large market size. On the other hand, the promotion of China's new energy

commercial vehicles faces instability and challenge. With the improvement of indicators such as battery technology, underlying operating system, electronic and electrical system architecture, and intelligent networking, and with the popularization of support policies such as exemption from purchase restrictions, exemption from travel restrictions, right-of-way, and subsidies, the development of new energy commercial vehicles is meant to be fast and inevitable. However, due to imperfect supporting facilities, battery technology bottlenecks, and higher prices, and with the year-on-year decline in state subsidies, difficulties in bank loans, and increased operating pressures, the popularization of new energy commercial vehicles still seems arduous and long.

In 2015, the General Office of the State Council issued *Guidelines on Accelerating the Financial Leasing Industry Development [2015] No. 68* (hereinafter referred to as the *Guidelines*). In the *Guidelines*, it is encouraged to develop new energy commercial vehicles and the corresponding supporting facilities through financial leasing, especially in fields such as buses, taxis, and official vehicles. Financial leasing is a consumer credit service that is convenient and flexible. On the one hand, financial leasing separates the ownership and the right of use and accepts residuals. In this way, financial leasing can lower the threshold for buyers to purchase a car and alleviate the pressure of one-time payment.

On the other hand, financial leasing separates the car and the battery and uses the charging station and the charging pile as the subject matter of the financial leasing. In this way, the pressure of promotion and finance can be alleviated, the technical risks and financial risks can be shared, and the capital pressure and operation risks of the charging facilities can be reduced. Currently, in China's new energy vehicle sales, the penetration rate of financial leasing is about 14%, which is expected to increase to about 22% by 2025. In the financial industry chain of vehicles, vehicle financial leasing has realized financing through assets. With its flexible business model and higher economic returns, vehicle financial leasing has been favored by more and more vehicle business operators and customers. In addition, with the rising of China's new middle class and the upgrading of consumption, the financial market of vehicles has a large room for expansion. Nowadays, the post-90s and post-00s, which have advanced consumer concepts, have become the main force of vehicle consumption. Therefore, the overall acceptance and recognition of vehicle financing will continue to increase as time goes by.

The financial leasing of vehicles is mature in foreign countries, but it is still an emerging field in China. Therefore, the models of financial leasing still require exploration and optimization, and related policies and laws still need constant improvement. The development of new energy commercial vehicle financial leasing is accompanied by many risks. It is

foreseeable that SQ company, the research object of this thesis, will usher in a broad market and face a more competitive market and increasing risks at the same time. Under this situation, SQ company needs to keep up with the market trend and actively find new business growth poles as well as profit growth points. Exploring the pricing strategy and risk avoidance strategy under the "new energy commercial vehicle + financial leasing" model is an important issue faced by new energy commercial vehicle financial leasing companies.

1.1.2 The development of China's financial leasing industry

Modern financial leasing originated in the United States in the early 1950s and was developed in the United Kingdom and Japan in the early 1960s. Its performance in relieving the difficulty of obtaining long-term loans for small and medium-sized enterprises made it welcomed worldwide. Later, financial leasing quickly spread across the world and became an important medium and long-term debt financing source for enterprises. Financial leasing in China began in the 1980s. For more than 30 years, financial leasing has generally experienced the following stages.

Firstly, the initial stage. During the period of China's reforming and opening up, there was a shortage of foreign exchanges. To attract foreign capital, China Leasing Company. the first domestic financial leasing company, appeared in China. Secondly, the tortuous stage (1986-1989). The number of financial leasing companies expanded rapidly then, and banks began to intervene in the management and approval of financial leasing companies. In 1989, foreign countries stopped lending to domestic-funded enterprises, resulting in a decline in the leasing amount. Thirdly, a rapid growth stage (1990-1992). The total amount of leases in China was gradually increasing then. When Deng Xiaoping, China's national leader then who proposed the concept of China's reforming and opening up, visited Shenzhen in 1992, the leasing amount and leasing penetration rate reached their historical highs. Leaseback was the leasing method that was mainly adopted at that time. Fourthly, the shrinking stage (1993-1999). Due to the cancellation of some preferential leasing policies by the nation and the impact of the bubble economy, the development of the financial leasing industry has been declining. By 1999, the financial leasing industry was almost at a standstill. Fifth, the recovery stage (2000-2006). During this stage, the external environment of the financial leasing industry has been thoroughly improved. Policies were introduced to law, finance, regulation, and taxation, which were regarded as the four pillars of financial leasing. Banks start to enter the financial leasing field and quickly brought the industry to recover. At this time, the financing function of leasing

companies began to develop into intermediary function and asset management function, showing the characteristics of modern leasing. Sixth, the rapid development stage (from 2007 to now). The management of the financial leasing industry has received attention. As the supporting role of financial leasing in the real industry become prominent, new policies were introduced to regulate and improve the financial leasing industry. On August 26th, 2015, Premier Li Keqiang of the State Council convened an executive meeting. To better serve the real economy, the meeting had determined measures to accelerate the development of financial leasing. China's financial leasing industry entered a stage of rapid development.

Financial leasing played an active role in China's economic development and positively promoted and improved society. In production, financial leasing can expand the investment, drive employment, accelerate technological improvement and equipment upgrading, and promote high-tech and equipment. In the field of circulation, financial leasing can improve the traditional circulation model. By dividing production, sales, and transportation, a one-stop production system, supply and marketing can be established to promote product circulation and sales, thereby increasing market share. In finance, financial leasing can change the loan financing method, improve the problematic situation of corporate loans, optimize the asset structure of banks, and expand the financing scale of enterprises. In the fiscal field, the combination of financial leasing and fiscal policy can improve the original fiscal investment method and give full play to the leverage of fiscal funds.

The in-depth practice and the prominent role of financial leasing in production are inseparable from the continuous improvement of the financial leasing environment in China. The establishment of the China Financing Guarantee Association in 2013 marks a new chapter in China's financial leasing industry. In terms of relevant laws, regulations, and policies, the *Financial Leasing Contract* in the *Contract Law of the People's Republic of China* released in 1999 has regulated the nature of financial leasing transactions as well as the responsibilities and rights of the transaction parties in detail, which guarantees a legal environment for developing the financial leasing industry. The *Financial Leasing Company Management Rules* (China Banking Regulatory Commission, 2014) stipulate the institutional setup, business scope, and supervision of the financial leasing companies. Referring to international conventions, *Accounting Standards for Enterprises-Leasing* (Ministry of Finance of China, 2018) divides lease accounting into operating lease accounting and financial leasing accounting, which clarifies the basic principles and methods for lessors and lessees in dealing with the accounting treatment and information leakage under different conditions. The revised *Administration of Automotive Loans Procedures* (The people's bank of China, 2017) expands the vehicle loans

business from specific institutions to commercial banks, urban and rural credit cooperatives, and vehicle finance companies. Meanwhile, mandatory guarantees for borrowers are no longer required. The improvement of relevant laws and policies has effectively guaranteed the healthy and long-term development of China's financial leasing industry and has also pointed a direction for the financial leasing industry.

Supported by market demand and policies, China's financial leasing companies have developed rapidly. According to the *Report on the Development of China's Financial Leasing Industry in 2018* released by China Leasing Alliance, from 2010 to 2018, the number of financial leasing companies has increased from less than 200 to 11,777, with nearly 65 times increase. By the end of 2018, the number of financial leasing companies was 11,777. Compared to 2017, the companies have increased by 2,101, with the growth rate being 21.7%. According to different regulatory authorities, China's financial leasing companies can be divided into financial leasing companies, domestic financial leasing companies, and foreign financial leasing companies. Before April 2018, financial leasing companies were approved by the Ministry of Commerce and belonged to non-bank financial institutions. The reference policy is *Financial Leasing Company Management Rules* (China Banking Regulatory Commission, 2014). Domestic financial leasing companies were approved by the Ministry of Commerce and the State Administration of Taxation and belonged to commercial intermediary organizations. The reference policy are *Measures for the Supervision and Administration of Financial Leasing Enterprises* (China Ministry of Commerce, 2013) and State Administration of Taxation's *Notice on Financial Leasing* (China Ministry of Commerce, 2014). Foreign financial leasing companies were approved by China Banking Regulatory Commission and belonged to foreign-invested enterprises. The reference policies include *Policy of Domestic Financial Leasing Companies* and *Rules on Foreign Invested Leasing Industry* (China Ministry of Commerce, 2015). In terms of supervision force, *financial leasing companies > domestic financial leasing companies > foreign financial leasing companies*. In terms of business scope, *financial leasing companies > domestic financial leasing companies > foreign financial leasing companies*.

The *Report on the Development of China's Financial Leasing Industry in 2018* released by China Leasing Alliance provides an industry overview. In terms of financial leasing companies, by the end of 2018, the total number of domestic financial leasing companies in China was 397, with an increase of 117 and a growth rate of 41.8 % compared with the previous year. There were 11,311 foreign financial leasing companies nationwide, with an increase of 1,984 and an increase rate of 21.3% compared with the year earlier. In terms of registered capital, by the end of 2018, the nation-wide registered capital of the financial leasing industry was approximately

¥3,276.3 billion. Compared with ¥323.1 billion in 2017, the growth was ¥173.2 billion and the increase rate was 5.4%. In terms of business volume, the growth rate of the national financial leasing contract balance has continued to decline since 2014. By the end of 2018, the national financial leasing contract balance was ¥6,650 billion, with the year-on-year growth being 9.38%. The growth speed has decreased by 5 times compared with 2014. According to *China Financial Leasing Industry Development Report* (China Leasing Alliance, 2019), by the end of December 2019, the number of financial leasing companies in China was 12,130 (excluding single project companies, branches, special purpose vehicle companies, local leasing businesses in Hong Kong, Macao and Taiwan, and acquired overseas companies). Comparing with 2018, China's financial leasing companies in 2019 has increased by 353, with the growth rate being 2.91%. In 2019, there were 70 financial leasing companies newly approved, which has increased by 1 and has a growth rate of 1.43% compared with 2018. Meanwhile, there were 403 domestic leasing companies newly approved, which has increased by 6 and has a growth rate of 1.51 % compared with 2018. As shown in Table 1.1, from 2010 to 2020, there are 71 financial leasing companies, 414 domestic leasing companies, and 11,671 foreign leasing companies in China. Among them, foreign leasing companies account for 96.01% of the total. The balance of leasing contracts is about RMB 6 trillion, of which financial leasing are about RMB 2.01 trillion, domestic leasing are about RMB 2 trillion, and foreign leasing are about RMB 1.975 trillion (Y. Shi & He, 2021).

Table 1.1 The number of financial leasing companies

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Financial leasing company	17	20	20	23	30	47	59	69	69	70	71
Domestic leasing company	44	66	79	123	152	190	205	276	397	403	414
Foreign leasing company	172	283	544	960	2020	4271	6872	8745	11311	11657	11671
In total	233	369	643	1106	2202	4508	7136	9090	11777	12130	12156

China's financial leasing industry has achieved rapid development. However, the financial leasing industry is still at an early stage and has certain shortcomings. Generally speaking, the shortcomings are mainly manifested in the following three aspects. Firstly, the operation of China's financial leasing industry is not standardized enough. Although the number of financial leasing companies continues to increase and the total business volume continues to grow, the overall operation is not very standardized. Especially for small and medium-sized financial leasing companies which tend to have little grasp of the logic and characteristics of their

business operations, their low standardization and poor recognition of the laws and regulations pose more significant risks in their operations. Secondly, the market penetration rate is low. Compared with the 20%-30% market penetration rate of financial leasing in European and American countries, the market penetration rate of financial leasing in China is only about 5.5%, indicating much room for improvement. Market penetration rate of financial leasing refers to the ratio of the total financial leasing transactions to the year's total investment in fixed assets. The market penetration rate marks the development depth of the financial leasing industry in a country. Thirdly, the pricing mechanism of the product is non-standardized and unreasonable. China's financial leasing industry is still at an early stage, and the entire industry has not yet formed a standardized and unified pricing mechanism. Therefore, most companies set prices based on their conditions, which caused severe bank credit, mutual emulation, and pricing competition.

In summary, financial leasing, as an "imported product", has undergone more than 30 years of development in China. It has dramatically improved not only in terms of the enterprise number and total business volume but also in legal policies and market environment. Financial leasing plays an essential role in optimizing resource allocation, supporting enterprise development, accelerating technological transformation, and promoting economic growth. The entire industry has broad development prospects. However, financial leasing has certain risks as an innovative financial product that combines multiple transactions such as trading, financing, and leasing. In addition, various factors such as irregular operation, market uncertainty, and inadequate supervision require financial leasing companies to pay more attention to the research and prevention of risks. Among them, the lack of pricing theory, the irregular and unreasonable pricing mechanism, and the intensified market competition have directly restricted the financial leasing industry and the promotion and development of new energy commercial vehicles. This thesis focuses on the pricing strategy and risk management of the new energy commercial vehicles financial leasing industry, a fundamental problem in this growing area that can bring value to research and enterprises.

1.2 Research on financial leasing

1.2.1 Foreign research on financial leasing

It is generally believed that the beginning of financial leasing was the establishment of an American leasing company in California in May 1952. Later, as the economy of various

countries recovered and the demand for funds increased, financial leasing, an innovative financial method, has achieved rapid development worldwide. Recognizing the prospect of financial leasing, foreign scholars have conducted considerable research on this topic.

Regarding the overview of financial leasing, Amembal et al. (2000) held that financial leasing is developed from simple leasing to financial leasing. Based on previous studies, Amembal et al. (2000) divided the development of financial leasing into five stages: simple leasing stage, innovative financial leasing stage, operating leasing stage, initial leasing stage, and mature leasing stage. Amembal's division of the financial leasing stages is called "leasing cycle theory", which is generally recognized by the industry because the theory vividly describes the development path and direction of financial leasing. British scholars Bennie et al. (1991), James (1994), and Kamath et al. (1995) analyzed the classification, characteristics, functions, and principles of financial leasing in their works. They divided financial leasing into traditional leasing and modern financial leasing. Current financial leasing includes leveraged leasing, manufacturer leasing, sale, and leaseback. Richard and Tony (2002), two American financial leasing experts, conducted a detailed analysis of the specific operation process of financial leasing. Warren and Walt (2007) pointed out that the transaction structure and power structure of financial leasing should be arranged by the relevant parties. The mainstream of the research held that the relevant parties involved in financial leasing are vender, lessor and lessee (Barkley & Barbara, 2011). From an economic point of view, Batkovskiy et al. (2016) proposed that leasing is more effective than loans, and leasing can ensure the scientificness of industrial enterprises and the modernization of production technology. Vovchenko et al. (2018) argued that leasing can be used as an effective tool covering medium-to-long term financing, and they proposed the modern leasing method based on the effective personnel training system.

Regarding financial leasing transactions, Atamer et al. (2006) divided financial leasing motives into two categories: the motive for off-balance-sheet financing and the motive for using financial leverage on assets. Bruce (1995) analyzed the benefits of financial leasing to users from multiple aspects. By analyzing cases, Hoffman and Phillip (2014) found that companies with scarce financing channels and low credit ratings are more willing to use financial leasing to conduct transactions. In terms of vehicle financial leasing transactions, Amadio (1996) analyzed the types of vehicle financial leasing and the corresponding advantages and disadvantages in the U.S. Zall (2002) discussed the content that needs much attention in financial leasings, such as taxation, finance. Fabozzi (2000) suggested that the qualification of the lessee needs to be assessed before the leasing, and the lessee's use of equipment requires close monition. Jessie and John (2006) compared car leasing and car credit in the U.S. vehicle

market. Bulmash (2006) carried out research and pointed out that sellers took more risks in financial leasing. Steven (2007) researched car consumers' perspectives and found that consumers prefer financial leasing to full payment when purchasing a car. Orlova and Afonin (2015) considered leasing to be another source of financing, which does not directly compete with bank loans. Collecting data sets from 40 countries from 2000 to 2016 and using the dynamic panel threshold effect model, Y. Zhang et al. (2019) found that under a moderate level of financial leasing, bank loans significantly promote economic growth, while this effect does not exist under a high level of financial leasing. The research result shows that the use of traditional and emerging financing tools should be based on the country's economic structure and financial intermediary system.

Regarding the risk management of financial leasing, Schmit (2010) analyzed the possible types of risks in financial leasing, such as political risk, tax risk, currency risk. To avoid these risks, Schmit proposed corresponding measures. Steingold and Portman (2005) analyzed the credit risk of financial leasing specifically. Based on the causes of various risks, Laurent et al. (2009) conducted risk identification, risk analysis, and risk control before, during, and after the risk. By analyzing the characteristics of financial leasing, Q. Sha (2002) made an in-depth analysis of risks such as market risk, financial risk, technical risk, trade risk, and environmental pollution in financial leasing, and suggested establishing a credit mechanism. Hank (2006) argued that in automobile financial leasing, although the financial leasing company has the ownership of the automobile, they also bear the risks of the leased property's integrity and residual value. Bulatova et al. (2017) pointed out that the risk management methods of leasing companies should be introduced to the management practices of newly established companies. The risk management methods mainly include: establishing a self-reliant leasing company credit risk management system and a credit risk management mechanism for specific leasing project or project portfolio; establishing a mechanism that provides risk-learning; establishing a system that can provide data support for the analysis process of leasing projects. Barykina (2019) put forward that when determining leasing risks, the step-by-step planning should be used to enable leasing departments to find the best solutions and manage risks.

Regarding the pricing strategy of financial leasing, Sharpe (1964) proposed the Capital Asset Pricing Model based on the asset portfolio theory. Black and Scholes (1973) put forward the option pricing theory based on the in-depth study of option price issues. Ross (1976) constructed the arbitrage theory of capital asset pricing. Shefrin and Statman (1994) established a Behavioral Asset Pricing Model. O'Hara et al. (2002) analyzed the pricing process and pricing results of financial assets from a micro perspective. All of the theories and models mentioned

above provide the basis and logic for formulating financial leasing pricing strategies. H. Zhang et al. (2015) put forward a financial leasing valuation model and a binary tree option pricing model, which could provide theoretical support for project in terms of financing leasing decision-making and pricing. Considering the problems and risks of leasing, Rabbani et al. (2015) thought that pricing decisions should be made in the leasing problem of different customers, different quality levels and different pricing methods. Siregar (2019) used the arbitrage pricing theory (APT) to obtain the impact of political risks and macro factors on the rate of return.

1.2.2 Domestic research on financial leasing

Financial leasing in China began in the 1980s. After 30 years, the financial leasing industry has developed rapidly. However, there is still a large gap between developed countries and China in terms of financial leasing. Most domestic research on financial leasing is based on the existing foreign theories and models, and the main directions are risk discussions, policy recommendations, and industrial applications from the macro-level. As for industry applications, financial leasing is mainly applied in aviation, shipbuilding, urban railway, harbor, coal and steel, construction machinery, new energy. new energy commercial vehicles are an emerging industry in China and are still at the early stages of development, so there is scarce related literature. Therefore, the thesis would sort out the literature on financial leasing and vehicle finance in the traditional vehicle industry, which would be used as the theoretical basis.

Regarding the overview of financial leasing, Z. Y. Zhang and Zhang (1990) wrote *Financial Leasing*. The book illustrated the origin and development of financial leasing, China's financial leasing industry, and macro-management. Z. S. Jiang and Zhou (2001) considered that financial leasing has become the second largest financing method after bank credit, which occupies an important position in the international capital market. Financial leasing is not only a corporate financing method, but also a supplementary means of bank credit. The lessor of financial leasing has to bear both the debt risks arising from financing and the risks related to the leased property (X. Y. Hu, 2011). H. B. Lv (2015) divided China's financial leasing industry into six stages: introduction stage, rapid growth stage, rectification stage, law construction stage, revitalization stage, and fast development stage. Tang et al. (2006) put forward suggestions for promoting the financial leasing industry. J. P. Chen et al. (2014) argued that financial leasing could serve the real economy, so he analyzed the financial guarantee function of financial leasing on real economic development. Y. P. Shi (2004) held that the combination of funds and assets could

meet the financing needs of small and medium-sized enterprises. W. Chen (2017) analyzed the business classification, company classification, practical operation process, industry cases. In vehicle applications, X. L. Lu (2014) studied the function and role of financial leasing and analyzed the credit risk management of financial leasing in the vehicle industry. From the perspective of manufacturers, C. K. Zhu (2017) conducted an empirical research on the basic theory of financial leasing and analyzed the impact of financial leasing on the quality of manufacturers' accounts receivable. Cui and Shi (2020) constructed a theoretical framework to analyze the long-term and short-term development characteristics of China's financial leasing industry, and concluded from the perspective of financial leasing industry development that China's financial structure has the characteristics of bank dominant. Y. Shi and He (2021) considered that financial leasing can connect the equipment and funds needed for enterprise production, and has the dual attributes of asset and financing.

Regarding financial leasing transactions, J. D. Liu (2002) put forward the viewpoint of "credit ownership" based on the legal issues of international financial leasing transactions. S. P. Gao and Wang (2013) discussed the legal structure of financial leasing transactions based on the view that "financial leasing transactions are two-party transactions between the lessor and the lessee". Liang and Li researched legal issues and contract disputes related to financial leasing. J. H. Wang and Chen (2012) put forward specific methods for handling value-added tax based on the analysis of national taxation regulation. Chu (2018) analyzed the protection of leasehold rights in financial leasing from the perspective of the lessor. In the consumer finance market of the vehicle, Y. J. Chen (2006) investigated the profit model of vehicle finance at home and abroad and proposed relevant recommendations. J. G. Wu (2010) put forward measures to promote vehicle financial leasing from the macro and micro levels according to the development of China's vehicle industry. Y. He (2011) made some relevant suggestions on the design and innovation of auto finance products based on the research of personal consumption credit in China.

Regarding the risk management of financial leasing, J. Yang and Han (2010) argued that the principal risks of financial leasing are credit risk and financial risk. L. Wang and Lu (2013) analyzed the composition and reasons of risks in financial leasing and proposed a risk monitoring and early warning mechanism. Referring to the process of financial leasing, Zheng (2013) analyzed the risk management of each part of the process. X. Huang (2012) studied the risks faced by different entities in the financial leasing business. Pang (2014) put forward specific suggestions on the risk management of various participants. Regarding the risk management of vehicle financial leasing, J. Wang (2014) analyzed the tax issues encountered

by financial leasing companies. Zeng and Li (2015) pointed out the importance of the lessor and the lessee's operating conditions and integrity. J. He (2014) analyzed the financial risks in the process of financial leasing. Tian and Chen (2013) carried out research on the problems of China's vehicle financial leasing and pointed out the corresponding causes and countermeasures. X. L. Lu (2014) paid attention to the application of the risk rating model in vehicle financial leasing. Sheng (2014) took a specific company as an example to discuss the damage of an outdated risk-avoidance mechanism to vehicle financial leasing. Y. Y. Yu (2015) examined the necessity of improving the risk avoidance system in reducing the risk of vehicle financial leasing. K. Zhou et al. (2016) gave suggestions on how to prevent the credit risk of financial leasing from the perspective of the external and internal environments of financial leasing companies. As for the external environment, China should establish and improve the social credit system, cultivate and develop the second-hand equipment market, establish and improve the registration system of ordinary movable property, strengthen the construction of industry data, and promote the advancement and promotion of equipment control technology. As for the enterprise, it is necessary to optimize project placement decisions, strengthen the management and control of leased properties, pay full attention to the secondary market prices of leased assets, improve the level of information management, optimize the margin mechanism, and implement a full-cycle credit risk management mechanism for financial leasing. Xia et al. (2018) applied the CAMELS model to the risk assessment of financial leasing companies, and made suggestions on the operation and management, risk prevention and control, and the construction of financial leasing risk indexes of financial leasing companies. That is, improve management capabilities and profitability by achieving differentiated development; build a reasonable debt structure and be alert to liquidity risks and market risks; explore an effective financial leasing risk index and establish a long-term risk monitoring mechanism. Y. L. Xu (2018) held that it is necessary to enrich financing varieties, expand cooperative financial institutions, innovate financing models and strengthen the company's internal liquidity management to cope with the liquidity risks faced by financial leasing companies.

Regarding the pricing strategy of financial leasing, the research on the pricing of financial products in China mainly considers finance and risks. As for financial factors that affect pricing, Y. W. Zhang and Li (2010) studied financial factors that affect the lessors, such as expected return rate and payback period, as well as financial factors that affect the lessees, such as loan interest rate and equipment value. H. N. Jia (2015) carried out research on the pricing of financial leasing and paid attention to factors such as financial leasing period, principal, margin, and payment method. Z. Y. Lu et al. (2017) considered 12 elements in the pricing of financial

leasing products and studied the pricing methods and element adjustments of financial leasing. As for pricing research that is based on risk factors, Zhong (2009) referred to the form of cash flow and established a pricing model for financial leasing products based on the JLT model (Robert et al., 1997), transition probability matrix. Gu (2011) combined the risk factors with the shareholders' required returns and costs and established a pricing formula. Z. G. Wu (2012) established a risk pricing model by analyzing the risk factors included in financial leasing. W. Zhang and Gao (2019) proposed that interest rate pricing is the main factor affecting corporate financing costs. They provided a theoretical method for the risk pricing of financial leasing assets, and the application of the method requires three conditions: The first is to establish and improve the secondary transaction market for the circulation of financial leasing assets; the second is to improve the value evaluation methods of leased assets; the third is to establish a more complete credit rating mechanism. You (2020) constructed a financial leasing pricing model suitable for practical applications from customer risk, capital cost and business synergy. X. Gao (2020) carried out a researched and came to the conclusion that six factors will affect the issue price of asset-backed securities issued by financial leasing companies. The six factors are: bond issuance scale, bond issuance period, bond external rating, current gross domestic product, current treasury bond interest rate and M2 broad money supply growth rate.

1.3 Research question and research purpose

Instead of solely being an industry, financial leasing is an integration of multiple sectors. Although financial leasing is a multi-purpose tool, it is not a panacea. For the new energy commercial vehicle industry, how to use financial leasing as a financial tool to serve the enterprises and consumers in the industry chain, and then promote the overall development of the entity is a major issue faced by the industry. Like the financial leasing in other sectors, the new energy commercial vehicle financial leasing is also confronted with pricing and risk issues. Taking the new energy commercial vehicle financial leasing of SQ company as the research object, the thesis mainly studies the following points.

(1) What are the main risks in new energy commercial vehicle financial leasing?

Several risks accompany the process of financial leasing. Began in the early 21st century, China's new energy commercial vehicle originated from traditional vehicle leasing and developed with the rise of new energy commercial vehicles. However, affected by national policies, new energy commercial vehicle technology, and market acceptance, new energy commercial vehicle financial leasing has high risks. What are the main risks of new energy

commercial vehicles in financial leasing? This is the primary research question to be answered in the thesis.

(2) What's the relationship between risks and pricing strategies of new energy commercial vehicle financial leasing?

The pricing strategy of financial leasing products requires careful consideration of transaction characteristics such as financing, trading, and leasing, including lease principal, rent payment, lease interest rate, margin, handling fees, insurance. new energy commercial vehicle financial leasing companies usually determine their business models based on their market positioning, transaction structure, and specific customer needs to form a profit model. In different profit models, companies face additional main risks and influencing factors, which will lead to different pricing strategies.

(3) What kind of risk management strategies can new energy commercial vehicle financial leasing companies adopt in dealing with the main risks?

Based on analyzing the main risks faced by financial leasing companies and clarifying the relationship between risks and pricing strategies, financial leasing companies can adopt suitable risk management strategies according to their risk problems. The third research question to be answered in the thesis is how to weigh risk factors and innovate the pricing model considering the risk factors. The analysis of risk strategies can help SQ company and other peer companies manage risks properly in new energy commercial vehicle financial leasing.

1.4 Research content and research framework

Through the case analysis of the new energy commercial vehicle financial leasing in SQ company, the thesis sheds light on the pricing strategy and risk management in new energy commercial vehicle financial leasing. There are six chapters in the thesis, and the content of each chapter is as follows.

Chapter 1: Introduction. Firstly, this chapter introduces the research background, including the market status and related policies of China's new energy commercial vehicle and the development of China's financial leasing industry. Secondly, this chapter sorts out the foreign and domestic research on financial leasing, including the overview of financial leasing and research on transactions, risks, and pricing strategies. Thirdly, this chapter proposes the research questions and purpose, defines research content and framework, and illustrates the research contribution, laying a foundation for the subsequent research.

Chapter 2: Theory and literature review. In this chapter, three parts are included. The first

part is about financial leasing risks which include financial risks and environmental risks, and about the CAMELS evaluation system for self-risk evaluation and management. The second part is about the pricing strategy of financial leasing, including the profit model, pricing characteristics and principles, and the pricing model. The third part analyzes new energy commercial vehicle financial leasing, including its current situation and common problems.

Chapter 3: Research method and research design. The research method adopted in this thesis is a case study, and we choose SQ company as the research object. The research design mainly consists of data collection, data processing, and data analysis. Data collection includes the collection of primary data and secondary data.

Chapter 4: SQ company and its business. This chapter introduces SQ company and its new energy commercial vehicle financial leasing mainly from four aspects: the basic situation of SQ company's new energy commercial vehicle financial leasing business, its organizational structure and risk management structure, the leasing model, and business process, and the stakeholders.

Chapter 5: Field study: case analysis. Through the case study of SQ company, this chapter firstly introduces the company's vehicle rental business in the past three years and uses the CAMELS evaluation system to rate the operating indicators quantitatively. Then, this chapter sorts out the company's management measures and risk management strategies in the new energy commercial vehicle leasing business and organizes the company's main profit direction, pricing strategy, and potential risks in new energy commercial vehicle financial leasing. Moreover, this chapter analyzes the company's current pricing strategies and potential risks and puts forward specific suggestions.

Chapter 6: Coping strategy and avoidance strategy of risks in the case. Based on the risks mentioned in the previous chapters, this chapter proposed specific coping strategies and transfer strategies of the risks. Coping strategies of risks include diversifying business income, innovating business models, and improving risk management systems. Risk transferring strategies can be reflected in the pricing strategies of products. This chapter mainly presents the pricing theory and pricing model of SQ company.

Chapter 7: Conclusion and future research. This chapter discusses the research conclusions, research limitations, and prospects, and suggestions for future research.

The research framework is shown in Figure 1.1 below.

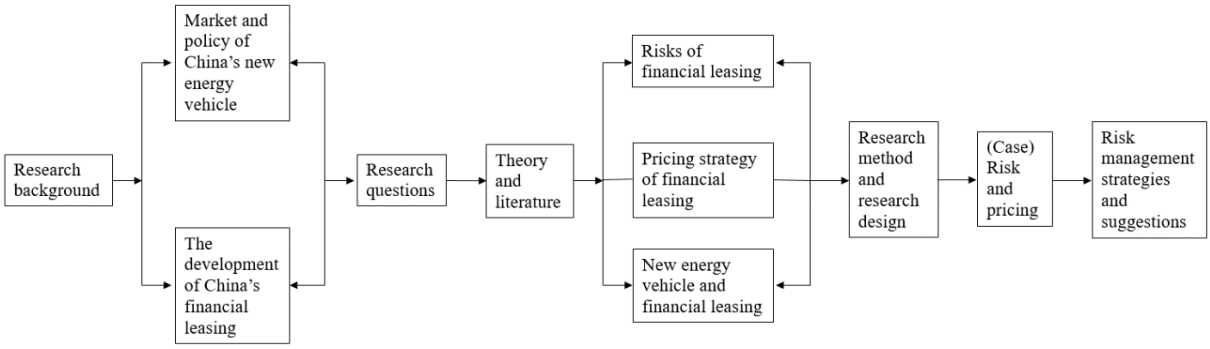

Figure 1.1 Research framework

1.5 Research contributions

Abiding by the research conventions of discovering problems, raising questions, and analyzing problems, following the steps of literature review, basic theory, status analysis, problem discussion, and proposal presentation, and taking the new energy commercial vehicle financial leasing of SQ company as the case, the thesis has made the following contributions.

For the first contribution, the thesis reviewed the related literature on financial leasing risks (including financial risks and environmental risks) as well as the management of financial risks and the coping strategy of environmental risks. The thesis also introduced how CAMELS model evaluates the risks of financial leasing companies. Through the literature review of the primary profit model and product pricing of the financial leasing industry, and the analysis of the business model, current situation, advantages, and problems of the new energy commercial vehicle financial leasing, the thesis found out the main risks in new energy commercial vehicle financial leasing, that is, financial risks and environmental risks. By doing this, the thesis provides a theoretical basis for identifying risks in the new energy commercial vehicle financial leasing industry. In addition, there is scarce research on new energy commercial vehicle financial leasing, as the business is still in its infancy in China so, this thesis can provide a theoretical basis for further research in this field.

For the second contribution, the thesis reviewed the business model and the corresponding profit model of SQ company's new energy commercial vehicle financial leasing. By combining pricing method systems, such as: capital asset pricing model, three-factor model, cash flow discount, and option pricing model, the thesis analyzed the influencing factors and pricing model of new energy commercial vehicles and found out the relationship between the current pricing model and its financial risks. Therefore, the thesis has contributed by providing new ideas and laying a foundation for risk management. Meanwhile, the thesis also includes pricing

references for financial leasing companies such as SQ company.

For the third contribution, the thesis listed the risk management problems faced by SQ company and proposed specific recommendations and suggestions, including strategies for risks and risk transferring based on pricing strategies. The strategy mainly includes diversifying business income, innovating the new energy commercial vehicle financial leasing, and improving the risk management system. Improving the risk management system comprises perfecting the risk management mechanism and system, upgrading the risk prevention and control system, and improving the risk treatment methods. These strategies have a specific effect on peer companies engaged in the new energy commercial vehicle financial leasing business. For example, the risk prevention and control system of SQ company can assist in the management and control of credit risks thanks to the company's user data and deep understandings of the industry. Peer companies who do not have these advantages can manage credit risk by accessing a third-party risk prevention and control system. All these are the management implication that this thesis can bring to SQ company and other companies.

Chapter 2: Theory and Literature Review

2.1 The risks of financial leasing

Financial leasing is a way of leasing where the lessor (or financial leasing company) firstly purchases products (or leased property) that meet the needs of the lessee (or enterprise) from the supplier and then leases the products to the lessee to collect rent. In financial leasing, the lessor owns the leased property, and the lessee only has the right to use it. According to the transaction structures, financial leasing can be divided into direct financial leasing, sale and leaseback, sub-leasing, leveraged leasing, percentage leasing. Among them, direct financial leasing, sale and leaseback and sub-leasing are the most common business types. In direct leasing, the lessor purchases the equipment from the supplier according to the lessee's requirements and then leases it to the lessee for use. The main feature of direct leasing is its long leasing period, which is usually 3-5 years. When it comes to large equipment, the leasing period can even reach 10 or 20 years. In direct financing, the lessee has the right to use the leased property and the responsibility to repair and maintain it. In sale and leaseback, the owner of the target property sells it to the lessor and then leases it back for use. The main feature of sale and leaseback is that the leased object is mainly fixed assets, and the primary purpose is to revitalize the fixed assets and improve the balance sheet. In sub-leasing, the lessor (or leasing company) leases equipment from other leasing agencies as the lessee and then subleases the equipment to the lessee as the lessor. The main feature of sub-leasing is that the entire business process involves many parties and contracts.

Financial leasing involves multiple parties such as lessor, lessee, supplier, investor, and covers finance, trade, technology, insurance, logistics, law, guarantee, recycling. Regarding government management and policy orientation, financial leasing has a certain complexity, and the primary profit of financial leasing companies comes from undertaking the risk premium of the business. Therefore, risks will accompany the entire business process of financial leasing. Whether a financial leasing company can effectively identify, prevent, and control risks have become the prerequisite and key to the survival and development of the company.

In essence, the risk is the uncertainty that affects the success in the future, but the risk can be reasonably estimated and prevented. The risk management of financial leasing means that

while providing services and sharing financial risks for customers, financial leasing companies should effectively manage the risks they may encounter and use risk prevention mechanisms and risk control measures to enable the company to minimize the risks while obtaining profits. Risk management is a systematic project that mainly includes risk prediction, identification, risk assessment, control. It is a multi-dimensional plan that integrates finance, environment, technology.

Since the beginning of financial leasing, practitioners and scholars have never stopped studying the risks in the process. In *Guidelines of International Leasing*, Amembal (1988) systematically analyzed the risks of international financial leasing, including currency risk, political risk, commercial risk, tax risk, and language risk. Amembal (1988) also discussed the transfer of risks. Based on financing, assets, technology, and business characteristics in financial leasing, Qiu (2001) analyzed the market risk, transaction risk, financial risk, technical risk, and environmental risk faced by financial leasing. He also introduced several risk assessment methods, including the simulation experiment method, investment estimation method, Monte Carlo analysis method. Qiu (2001) pointed out in *Risk and Control of Financial Leasing Companies* that the main risks faced by financial leasing companies include market risk, industry risk, credit risk, financial risk, legal risk, and management risk. Summarizing the previous studies on financial leasing risks, L. P. Wang (2010) put forward that the risks faced by financial leasing companies mainly include financial risk, market risk, credit risk, talent risk, policy risk, and force majeure risk. It is proposed that financial leasing companies should build a “three-dimensional” risk control system, establish risk management strategies, and conduct business project risk assessments. Based on previous researches on the risks of financial leasing, this thesis would review the financial risks and environmental risks faced by financial leasing companies.

2.1.1 Financial risks

2.1.1.1 Content of financial risks

The concept of financial risks can be understood from the broad and narrow senses. In a broad sense, financial risks refer to the differences between actual financial returns and expected returns due to many uncertain factors. These uncertain factors happen during the operation of an enterprise and are brought by the changing internal and external environments. In a narrow sense, financial risks are a company’s risks in financial activities such as financing, investment, cost control, operating capital management, and dividends. The financial risks discussed in this

thesis refer to the company's direct financial risks generated in financial leasing, which are closely related to the existing risk in the operation of the enterprise. Financial leasing risks is constantly changing, and it mainly includes financing risks, capital recovery risks, leased property value fluctuation risks. (G. Y. Zhang, 2003).

(1) Financing risks

Financing refers to the enterprise's financial activities to raise funds needed for activities such as daily operations, project investment, debt settlement (L. P. Wang, 2010). In China, enterprises have many financing methods, such as endogenous financing, venture investment, listing financing, commercial bank financing, private financing, project financing. Endogenous financing refers to the funds generated by the company's business activities. Composed by retained earnings and depreciation, endogenous financing is how companies convert their savings into investment. Venture investment is a financing method that provides financial support to start-up companies and obtains company shares. Listing financing is a method that allows companies to raise funds in a short time. By dividing the company's capital into equal amounts (in the form of stocks) and issuing the capital after the approval of circulation, the company can raise many funds. With banks as an intermediary, commercial bank financing is the leading debt financing channel for Chinese enterprises. Private financing is not the state's statutory financial institution, and it happens between the investors and the recipients. The purpose of investors is to obtain high interest, and the pursuit of recipients is to bring the right to use funds by paying the agreed interest. Private financing includes private lending, private bill financing, private securities financing, and social fundraising. Project financing is a form of financing that raises funds for more than one year in the project's name and pays the debt with project income.

Among the above financing channels, the financial risk of endogenous financing is the smallest. The amount of listing financing is significant, but it needs to go through strict approvals for listing qualifications, which means high requirements and a long time. Venture investment, commercial bank financing, and private financing require a high degree of matching between companies and investors, and mismatches are likely to occur when information does not match (B. Han, 2014). In practice, companies can combine different financing methods according to their actual conditions to reduce risk costs and improve operability. Companies need to meet two conditions for financing: one is to meet the capital structure requirements, and the other is to control the cost of the funding (B. Han, 2014).

The business of financial leasing companies determines the problems and risks in the financing process (P. Wang, 2017). Firstly, financial leasing companies have a large capital

demand. The business of financial leasing companies is to solve the one-time capital needs of customers, so financial leasing companies need a large amount of capital to support their own business. The amount of capital even determines the company's market shares, company earnings, company development. Secondly, the term of financial leasing business is generally long and the return on investment is slow. Most of the funds of financial leasing companies come from bank loans. Although the term of bank loans can be determined according to the companies' own needs, the period cannot be determined according to the leasing term, making it difficult to match the bank loan term with the leasing term. If the bank loan expires but the leasing period is not due, the company is faced with liquidity risk. Thirdly, financial leasing companies have the characteristics of high risk. Limited by market trust and credit, it isn't easy to diversify financing channels, and a single financing method cannot meet the company's development needs. If multiple financing channels can be combined, the risks will be reduced and the financing efficiency will be improved.

(2) Capital recovery risks

The profit of China's financial leasing companies comes from the interest spread income (Kong et al., 2012), which is the difference between the financial leasing company's leasing interest income and financing interest expense. Although the marginal cost of financial leasing companies' spread income is gradually decreasing due to the gradual increase in the debt cost - financial leasing companies still rely on the lessee to pay rent on time - to ensure the company's profits and maintain the company's normal operations. If the lessee fails to pay the rent on time due to credit or financial problems or even cannot continue to pay the rent, financial leasing companies will face more significant capital recovery risks.

Capital recovery risk is the main risk of financial risk. Many factors affect the capital recovery of financial leasing companies, with the most critical factors being the credit risk and the management risk in the process of financial leasing (Z. Ning & Gao, 2017).

The management risk is basically reflected in the financial leasing company lessor's selection and the process management of leasing projects. In terms of leasing project selection, financial leasing companies may make mistakes in decision-making due to an inaccurate understanding of the project's feasibility. In terms of process management, imperfect or problematic internal management procedures, operators, external events, may all cause risks in project operation. There are generally two main reasons for management risks generated by financial leasing companies. The first reason is the complexity of financial leasing. There are at least three stakeholders involved in financial leasing. With many agreements and contracts to be signed and knowledge in trade, technology, finance, law, and policy involved, the

complexity of financial leasing will likely cause management problems and increase risks. If the financial leasing company does not have a deep understanding and a proper implementation of the business, the risk will increase. The second reason is the particularity of the subject matter in financial leasing. The subject matter of financial leasing is usually high-value professional equipment with solid industry and technical characteristics, which is different from other financial institutions. If the financial leasing company has insufficient understanding, an incomplete grasp of the subject matter, and weak processing capabilities, then it is easy to cause management errors, increase business risks, and generate tremendous losses. In addition, the lessee's improper operation and poor maintenance of the subject matter will also increase the lessor's management risks.

Credit risk, also called default risk, refers to the risk that the three parties (supplier, lessor, and lessee) of the financial leasing cannot perform their responsibilities and obligations according to the contract. For financial leasing companies, the credit risks mainly come from suppliers and lessees. The supplier's credit risk is manifested in failing to complete the delivery of equipment in time due to various reasons, failing to provide the equipment that meets the technical standards agreed in the contract, or failing to provide approved maintenance and upgrade services. In essence, the lessor's leasing business is a kind of risk investment. If it is fully settled, the financial leasing company is making bond investments. If it is not fully settled, the financial leasing company makes bond investment and residual value investment. The lessee's credit risk can be divided into debt and property risks (Cao, 1999). The manifestation of debt risk could be: the lessee fails to repay the exact rent on time due to poor management and low efficiency; the lessee maliciously defaults on rent or evades debt due to business difficulties. Property risk is mainly manifested in the following aspects: Firstly, during the use of the equipment, the lessee fails to maintain and repair the equipment in accordance with the contract, or the lessee overuses the equipment, which would significantly damage the equipment and cause property loss to the lessor. Secondly, the lessee illegally disposes of the equipment assets owned by the lessor, including using the equipment assets for illegal acts such as mortgage guarantee, subletting, resale, causing the lessee to suffer property losses. Thirdly, when the leasing contract expires, the lessee does not return the leased equipment assets on time and with the required quantity and quality, making it difficult for the lessor to form the right of recycling the project assets, which in turn causes property losses.

As a result of the long contract period, various stakeholders, and broad knowledge fields, financial leasing companies have more significant management risks and face credit risks from suppliers, lessees, which forms higher capital recovery risks.

(3) Leased property value fluctuation risks

Leased property value fluctuation risks are mainly caused by changes in the leased property or the market. Significantly when the value of the leased property is extensively damaged, and its residual value is insufficient to make up for the rent, the lessor would have the possibility to suffer from the loss. The main reasons for leased property value fluctuation risks include technical updates, product iteration, value damage, and improper maintenance.

As new energy commercial vehicles are still in the stage of rapid development, equipment such as the core component batteries, battery management systems, electronic control systems are updated quickly. Meanwhile, because of uncertainties such as market liquidity, vehicle operation, wear, accident, quality defect, the cashability of new energy commercial vehicles will be significantly weakened, delayed, or even failed after leasing. Therefore, the leased property value fluctuation risks faced by the financial leasing companies engaged in the new energy commercial vehicle leasing business are particularly prominent. Meanwhile, the difference between new energy commercial vehicles and fuel vehicles is that new energy commercial vehicles require necessary infrastructures such as charging piles and stations, which increase the cost of workforce, material, and operation in the construction and development of the entire new energy commercial vehicle industry. Moreover, the immaturity of the second-hand market of new energy commercial vehicles has increased the risks of companies engaged in financial leasing.

Facing the leased property value fluctuation risks of new energy commercial vehicles, financial leasing companies engaged in related businesses need to prevent and transfer risks through methods such as purchasing insurance to reduce the value loss of the vehicle in the event of an accident. Consequently, there must be scientific and feasible risk management mechanisms and measures, such as: designing or adopting appropriate vehicle valuation models, predicting possible market changes, and designing matching pricing strategies to guarantee the liquidity, so that the cost of remaining rent can be covered when the car is realized.

2.1.1.2 Financial risk management

Financial risks exist in the entire operation process of financial leasing, which has certain particularities and complexity. To effectively manage the financial risks, enterprises must focus on the whole operation process, analyze various influencing factors, and conduct systematic financial risks prevention and control. It means that enterprises should identify the financial risks and possess risk measurement tools, and then take measures to manage financial risks and keep them at a controllable level to reduce financial losses caused by risks (J. X. Yu, 2012).

(1) Identification of financial leasing companies' financial risks

The financial risks of financial leasing companies have posed great dangers for the company's regular operation and healthy development. As the first step of financial risk management (Z. Ning & Gao, 2017), risk identification requires the company to systematically and comprehensively analyze and judge the internal and external environment to identify and research the possible risks. Risk identification mainly includes two aspects: evaluating the risks in the financial leasing project and finding out the mechanism and main reasons for the risks (X. M. Liang, 2018).

Both qualitative and quantitative analysis methods are used to conduct risk identification (X. M. Liang, 2018). Qualitative analysis methods include stage analysis method, risk identification matrix, flow chart analysis method. The stage analysis method divides financial risks into incubation period, attack period, deterioration period, and crisis period according to different degrees of financial risk, and then implements additional control measures. The risk identification matrix divides risks into four levels: low, medium, significant, and high, according to the degree of financial risk's impact on the company, and then different risk control measures are applied. The flow chart analysis method explores each process's financial risks according to the financial leasing business process, finds the possible causes of the induced risks, evaluates the potential losses, and then combines the business process and risk characteristics to control. Quantitative analysis methods include univariate analysis and multivariate analysis. The univariate analysis uses a single financial variable, such as current ratio, total asset-liability ratio, and return on net assets, to analyze financial risks and determine the risk possibilities. Multivariate analysis selects multiple financial variables for measurement and analysis and then uses the weighted-average method to summarize the variable data and analyze the financial risks of the company's business, such as the Z-score model and the F-score model with cash flow (S. H. Zhou & Yang, 1996).

(2) Prevention of financial leasing companies' financial risks

First of all, the financial risks of financial leasing companies exist in the entire business process, and the prevention and management of financial risks should also be throughout the business process as a whole (Z. F. Zhou, 2015). Before signing a contract, financial leasing companies need to conduct a professional evaluation of the leased property and mortgaged assets according to the market. Professional asset evaluating companies can be invited to assess and provide an evaluation report. Having a full grasp of the leased property's financial risk can give the basis for later work. When conducting the qualification checking, financial leasing companies can evaluate and divide the credit levels according to the demand and credit and

adopt different pricing strategies and risk management measures for varying levels of customers.

Secondly, invest in constructing the internal risk system and establish a financial risk control system (X. Z. Liu, 2015). Risk control process can be carried out in five steps (B. Han, 2014). The first step is to design the organizational structure of financial risk control so that departments such as risk control, internal audit, and compliance can collaborate effectively. Introducing and training professionals for different types of businesses are necessary during this process. The second step is to set financial risk control objectives according to the company's development strategy. Different businesses may have different control objectives, so that enterprises can try and explore related businesses according to their strategic needs. As for emerging areas, there may be relatively broad financial risk control objectives, but the controllability of risks should still be paid attention to. The third step is to evaluate financial risks regularly and irregularly to effectively prevent and control financial risks. A set of regular reporting systems for financial risks can be formulated and strictly implemented. The fourth step is to strictly implement financial risk control decisions and solutions promptly. The fifth step is to supervise and summarize the management of financial risks, find out the shortcomings in risk management and control, and then improve and perfect the weaknesses.

Then, regularly test and modify the financial risk control process (L. Ning, 2019). The financial risk control process will become outdated with changes in the financial leasing business, policy, and industry. The outdated financial risk control process will inevitably increase the financial risk of the enterprise, which makes it necessary to monitor the control process dynamically. For one thing, the company should regularly evaluate and predict the financial risk control process to test its rationality, soundness, and effectiveness. For example, whether the existing financial risk control process involves the financial activities of the entire business process, or whether the various departments are coordinated and executed smoothly, or whether the execution cost is reasonable, or whether the management effect of risk control meets expectations, all these should go through an evaluation process. The company should revise and adjust the financial risk control process based on the evaluation results. When evaluating the control process, it is necessary to analyze the shortcomings of the existing control process and its reasons and then propose corresponding process correction methods to control financial risks. For example, establishing the direction of process improvement, using the techniques and means for process modification, allocating professional talents, and improving management are methods that can be adopted.

Furthermore, adjust the business structure and diversify financial leasing risks (E. B. Zhao & Fan, 2016). To effectively prevent and manage the financial risks of financial leasing

companies, besides risk diversification methods such as controlling the credit and obtaining necessary guarantees, financial leasing risks can be diversified by adjusting the company's business structure, such as: strengthening industrial chain cooperation, expanding other business, providing personalized service and value-added services.

2.1.2 Environmental risks

2.1.2.1 The content of environmental risks

The operation environment of financial leasing companies is relatively complex because it involves many stakeholders, professions, and corresponding risk types. In addition to financial risks that directly affect the financial status, there are also environmental risks such as policies, exchange rates, industries, and markets. Refer to Table 2.1 for details.

Table 2.1 Environmental risks of financial leasing companies

Risk types	Main features
Market risk	Market risk mainly includes exchange rate risk, interest rate risk, and economic cycle risk. Exchange rate risk refers to the risk of loss when the company's business involves foreign currencies. Interest rate risk refers to the possible loss when the company's leasing business encounters a fluctuating interest rate. Economic cycle risk refers to the loss caused by the economic cycle during long-period financial leasing.
Policy risk	Due to changes in national taxation, laws, regulations, and related policies, financial leasing companies may suffer from operational, development, and risks caused by business investment policies, tax policies, and the business environment.
Industry risk	With the professional and differentiated development of the industry, financial leasing companies have their own financial leasing business in one or several sectors, or even in a particular field. The survival and development of enterprises depend on the rise and fall of the industry, and the changes and status of the industry deeply affect the enterprises.
Contract risk	Financial leasing has the contract risk. Both parties of the contract should verify the authenticity and validity of the agreement to clarify their rights and obligations, which could effectively prevent the rights and interests of both parties from being infringed.
Asset risk	Asset risk happens when the residual value of the subject matter is less than the leasing company's accounts receivable during the financial leasing period. Financial leasing companies need to adopt risk prevention measures to reduce and transfer risks, such as collecting deposits and assuming a reasonable pricing strategy.
Lagging technology risk	Lagging technology risk is when the leased property becomes obsolete, and the leased property value decreases sharply due to changes in technical standards and market demand.
Strategy risk	Strategic risk refers to loss caused by improper strategic planning or poor execution when a financial leasing company pursues short-term economic benefits and long-term development. The main characteristic of strategic risk is the inappropriate strategic objectives, which are manifested explicitly as the inability to adapt to environmental changes and achieve the established strategy in its organizational capabilities and resource allocation.
Reputation risk	Reputation risk is the risk of stakeholders' negative evaluation caused by the daily operation and management of the leasing company or other external events. Reputation risk may be a concurrent risk of different risks, which means other risks cause reputation damage.

2.1.2.2 Risk strategy

Generally, financial leasing companies will formulate their risk control systems and daily operation and development standards. According to financial leasing company's tolerance and willingness to risks, the risk strategy can be divided into three categories: none-risk strategy, low-risk strategy, and high-risk strategy (Li, 2018). The specific risk strategies that financial leasing companies can adopt include risk diversification, risk hedging, risk transfer, risk aversion, and risk compensation (Q. Y. Liu, 2014).

(1) Risk diversification strategy

Risk diversification strategy is to diversify and resolve the risks of financial leasing companies through various businesses. First of all, financial leasing companies can use specific risk diversification models to subdivide the financial leasing contracts according to the characteristics of the industry. By doing this, companies can form different industry risk indicators, calculate the investment weights of each industry classification, and plan corresponding funding quota and cost budget indicators (M. J. Wang, 2012). Then, financial leasing companies can use various businesses to diversify risks. Through asset portfolio management, subject matter separation leasing, and joint leasing, financial leasing companies can diversify their leasing objects and leasing business. In general, after adopting the diversification strategy of leasing objects and leasing businesses, the lessee's capital recovery risk and credit risk are relatively independent, which can significantly reduce the overall risk of the financial leasing company.

Besides diversifying the businesses, there are other risk diversification strategies in financial leasing, including: 1. Adopting various leasing forms, such as direct financial leasing, sale and leaseback, sub-leasing, leveraged leasing, percentage leasing. 2. Adopting different credit levels so that financial leasing companies can grant other leasing products and adopt different pricing strategies according to the credit levels of tenants. 3. Dispersing the leasing business in different regions. By adopting different products and pricing strategies in other areas, financial leasing companies can avoid bearing the risks of economic or policy crises from one part. 4. For international companies, leasing can be carried out through different currencies against the risks from exchange rate fluctuations.

(2) Risk hedging strategy

Risk hedging strategy is a strategy to offset the potential loss of the subject matter by investing or purchasing assets and derivative products that are negatively related to income volatility of the subject matter (Z. Y. Chen, 2007). Risk hedging strategy can effectively manage

exchange rate risk, interest rate risk, and commodity risk. Different from risk diversification strategy, risk hedging strategy can manage the systemic and unsystematic risks and reduce the risk to expectations by adjusting the hedge ratio according to the risk tolerance. When extreme events happen, risk hedging can play the role of pre-controlling and preventing financial risks, bringing certain benefits to investors (Xiao & Chen, 2015). Risk hedging strategies can be divided into market hedging and self-hedging (J. Y. Ding & Feng, 2017). Market hedging means that risks that cannot be self-hedged through the balance sheet and related business adjustments can be hedged through the derivatives market. Self-hedging implies that the financial leasing company takes advantage of the hedging characteristics of the balance sheet and the business portfolio that is negatively related to income and hedges the risks.

(3) Risk transfer strategy

Some foreseeable risks, such as interest rate risk, exchange rate risk, tax risk, can be transferred through the purchase of certain financial products or other measures. We call this the risk transfer strategy (M. S. Liu & Jin, 2016). For example, for the risks caused by interest rate changes, the financial leasing company can sign interest rate contracts or supplementary clauses with the customers, agreeing that the rent would be adjusted when the bank's interest rates become higher. In this way, the risks can be transferred. Financial leasing companies can also share risks through the following three ways. Firstly, purchasing insurances to transfer the loss to the insurance company and obtain the corresponding economic compensation when risks occur. Secondly, transferring risks through guarantees. The guarantee company can bear the related losses when the lessee cannot pay the rent as agreed. Thirdly, using futures contracts to transfer the price fluctuation risks to investors.

(4) Risk aversion strategy

Risk aversion strategy is that the financial leasing company rejects a particular leasing business (or exits a specific leasing market) based on its risk tolerance and willingness to avoid risks. In practice, rent arrears is a major problem faced by financial leasing companies. According to incomplete statistics, by the end of 2016, the average arrears of Chinese leasing companies accounted for 30% and even 60%- 70% of their total assets (X. J. Hu, 2020). Rent arrears would affect the cash flow of financial leasing companies and even affect the company's survival and development. Therefore, financial leasing companies should study the feasibility of the project, make a prudent judgment on the project's future profitability and the lessee's rent-repaying ability, conduct a detailed investigation of the lessee's credit, financial situation, and management capabilities in order to make an objective evaluation and selection of leasing projects. Risk aversion strategy can only be used as a supplementary strategy because while

avoiding risks; it also loses the opportunity to gain profits.

(5) Risk compensation strategy

Risk compensation strategy is a master plan when the financial leasing company judges the business as highly risky. Before the industry causes losses, the strategy could make a price compensation for the risks (Y. Wang et al., 2011). Financial leasing companies can obtain price compensation for risk-bearing through corresponding pricing strategies, such as adding a certain risk premium to the rent. For credit risk, in addition to adopting risk transfer strategies to compensate for risk, different price strategies such as: increasing the proportion of down payment and adjusting the amount of margin can also be implemented according to factors like the lessee's credit rating and project risk level. As for the depreciation risk of the subject matter, financial leasing companies can set different proportions of down payment according to the characteristics of the subject matter or develop a corresponding repayment strategy according to the depreciation cycle. This way, the lessors need to pay close attention to the technology and market dynamics of the industry and do an excellent job in market surveys and value change predictions.

Besides risk diversification, risk hedging, risk transfer, risk aversion, and risk compensation strategies, financial leasing companies can also suppress risks through early warning and handling of risks in the mid-stage of the project. In the late stage of the project, risks can be self-digested by establishing systems and handling losses. At different stages of the project, companies can adopt one or more risk strategies to manage risks according to different risk types. The specific summary is shown in Figure 2.1.

Figure 2.1 Risk management strategy in financial leasing

2.2 CAMELS evaluation system

The evaluation of financial leasing risk index has corresponding model research. Credit Metrics is the first quantitative model for evaluating credit risk in the world. It was proposed by the J.P. Morgan consortium and several international banks in 1997 (Morgan, 1997). Based on Value at Risk (VaR) theory and asset portfolio theory, Credit Metrics can evaluate the credit risk of financial instruments such as loans and bonds. Credit Metrics is used in the evaluation of credit ratings in commercial banks in China (W. J. Wang & Wu, 2008), and the cooperation model of "bank + insurance company + dealer" is adopted in the development of vehicle consumer credit (C. L. Lu, 2004). T. X. Zhang (2003) used fuzzy analytic hierarchy process theory and fuzzy comprehensive evaluation theory to create a measurement model on financial leasing contract risks (T. X. Zhang, 2003). G. D. Xu et al. (2003) used the Black-Scholes model and real options method to realize effective management of leasehold risks by evaluating the option value of large leases (G. D. Xu et al., 2003).

Among the evaluation methods of financial leasing risk index, the CAMELS model for comprehensive risk evaluation is the most widely studied and used model. According to Dash and Das (2009), the CAMELS model was developed by the U.S. federal regulatory agency in the 1970s. It was originally used for the performance evaluation of commercial banks' operational quality. After long-term practice and improvement, it was also applied to the risk assessment of financial leasing. The CAMELS model consists of six elements: capital adequacy, asset quality, management, earnings ability, liquidity, and sensitivity to market risk. The CAMELS model selects appropriate and calculable indicators to calculate the numerical results of the above six elements according to the evaluated object's actual situation to conduct a comprehensive assessment of the business risk.

2.1.1 Capital adequacy

Capital adequacy, the ratio of net capital to total risk assets, is the primary element of the CAMELS model. Capital adequacy is an essential indicator for evaluating the operating capabilities and risk coping capabilities of leasing companies and is a prerequisite for ensuring regular operation and healthy development. When losses and risks occur, sufficient capital and a healthy capital structure are the basic guarantees for dealing with risks. The higher the capital adequacy is, the stronger is the financial leasing company's ability to absorb risks. According to the *Basel Agreement*, capital includes core capital and supplementary capital, and the amount

of additional capital shall not exceed the amount of core capital.

On November 29th, 2019, China Banking and Insurance Regulatory Commission issued the *Method of Governing, Supervising and Evaluating Banking and Insurance Institutions (for Trial Implementation)*, which stipulates that financial leasing companies shall conduct ratings according to the *Internal Guidelines on the Regulatory Rating of Commercial Banks (for Trial Implementation)*. According to China's financial leasing industry development, capital adequacy can be rated following the five criteria.

Level 1: Capital adequacy being 10% and above indicates that the company's capital is relatively sufficient, the asset quality is high, the ability to deal with risks is strong, and the potential risks are small.

Level 2: Capital adequacy between 8% and 10% indicates that the company's capital is moderate, the asset risk is small, and the business development is profitable and stable. According to *Basel Agreement* and *Administrative Measures for Financial Leasing Companies* issued by China Banking Regulatory Commission in January 2007, the capital adequacy of each financial leasing company should reach 8% or more.

Level 3: Capital adequacy between 6%-8% indicates that the company's capital is below the general level, and it is difficult to cope with the losses caused by risks. It also shows that the capital structure is unreasonable and does not meet the regulatory agency's requirements.

Level 4: Capital adequacy between 4% and 6% indicates that the company has insufficient capital, which may be due to excessive business development. It also suggests that the financial leasing company has general profitability, and the usual operations may be affected.

Level 5: Capital adequacy below 4% indicates that the company's total capital is seriously insufficient and the proportion of risk-free assets is too low. At this stage, it is urgent to seek support from shareholders or external capital. Meanwhile, the company should improve its profitability and capital structure as soon as possible.

2.2.2 Asset quality

Asset quality is an important indicator to measure the overall operating conditions of a financial leasing company. It can reflect the degree of risk in the operation and management of the leasing company. To measure the asset quality of a leasing company, a comprehensive judgment can be made by combining indicators such as rental recovery rate, provision coverage rate, and customer financing concentration. The asset quality of a financial leasing company is closely related to the "asset impairment" in the income, so the asset quality of a financial leasing

company can be measured by “asset impairment/total assets” (H. W. Zhao & Zhu, 2017). In addition, the “non-performing asset ratio” can also be used to measure the company’s asset quality, that is, the ratio of non-performing assets to the company’s total assets. The lower the non-performing asset ratio is, the better the asset quality of the financial leasing company is. Non-performing asset ratio is usually used to measure the quality of assets and provision coverage ratio, the ratio of loan loss reserves to non-performing loans. The asset quality can also be measured by asset overdue rate (= expected rent/lease assets) and the change rate of the ratio of net profit to long-term receivables (Xia et al., 2018). The thesis chooses the indicators of “non-performing asset ratio” and “non-performing lease asset provision coverage ratio” to discuss the asset quality of financial leasing companies. The specific rating standards are as follows.

Level 1: The non-performing asset ratio below 1% and the non-performing lease asset provision coverage ratio above 150% indicate that the financial leasing company has good asset quality, adequate provisioning, strong credit risk management capabilities, and low operational risks.

Level 2: The non-performing asset ratio between 1% and 2% and the non-performing lease asset provision coverage ratio between 100% and 150% indicate that the financial leasing company’s asset quality is moderate and the provision is reasonable. The credit risk management ability is acceptable, and the operational risk is also within the controllable range.

Level 3: The non-performing asset ratio between 2% and 5% and the non-performing lease asset provision coverage ratio between 50% and 100% indicate that the asset quality of the financial leasing company is average, and the provision needs to be increased. The company’s ability to manage credit risks needs to be strengthened, and the company has certain operating risks.

Level 4: The non-performing asset ratio between 5% and 10% or the provision coverage ratio of non-performing lease assets below 50% indicates that the financial leasing company has poor asset quality and insufficient provision. Risk management capabilities need to be strengthened urgently, and the company has relatively significant operating risks.

Level 5: The non-performing asset ratio above 10% and the provision coverage ratio of non-performing lease assets being 0% indicate that the proportion of the financial leasing company’s assets is too high. This implies that the company has not calculated and provisioned the non-performing assets following the corresponding regulatory requirements and accounting regulations. The company’s credit risk may make it difficult to continue normal operations.

2.2.3 Management

The management process of a company cannot be wholly measured quantitatively. For example, corporate governance, organizational construction, compliance management, company decision-making environment, business process design, are indicators that cannot be precisely quantified but will affect the company's management. Therefore, the "main business income/total assets" can be used as an indicator to measure management (H. W. Zhao & Zhu, 2017) quantitatively. The total asset turnover rate (sales revenue/average total assets) and profit growth rate (this year's net profit-last year's net profit) can also be used as a quantitative indicator (Xia et al., 2018). The total asset turnover rate measures the company's flow rate from input to output during the operation, reflecting the company's asset utilization efficiency and management quality. The profit growth rate can reflect the changes in the company's profitability during the process, and profitability is also an essential manifestation of the management.

According to the *Administrative Measures for Financial Leasing Companies* promulgated by the China Banking Regulatory Commission in 2017, financial leasing companies should construct a capital management system in accordance with relevant regulations, establish an asset quality classification system and a reserve system, set up a sound internal audit system and regular external audit system, and implement the national unified accounting standards and procedures. It is also stipulated that financial leasing companies should strictly abide by the following regulatory indicators in Table 2.2.

Table 2.2 Risk management indicators of financial leasing companies

Indicators	Calculation method	Index value
Capital adequacy	Net capital/risk-weighted assets	≧8%
Single customer financing concentration	Single-tenant financing balance/net capital	≦30%
Single group financing concentration	Single group financing balance/net capital	≦50%
Single customer relevance	Single related party financing balance/net capital	≦30%
All relevance	All related party financing balance/net capital	≦50%
Single shareholder relevance	Financing balance of a single shareholder and all related parties/shareholder capital contribution	≦100%
Inter-bank lending ratio	Inter-bank borrowing funds/net capital	≦100%

In summary, the following rating standards can be used for measuring the management of financial leasing companies.

Level 1: Firstly, the company has high-level management and outstanding business performance and can effectively manage and control the risks. Secondly, the company has a sound system that can be strictly implemented, and the company's mechanisms such as internal

control, internal audit, external audit, are reasonable and adequate. Thirdly, all the company's risk indicators have met the requirements of compliance supervision.

Level 2: Firstly, the company has a specific management level and good business performance and can effectively control the major risks. Secondly, the system established by the company can be implemented, and mechanisms such as internal control, internal audit, and external audit are also installed. Thirdly, the company has one risk indicator that fails to meet the regulatory compliance requirements.

Level 3: Firstly, the management level of the company still needs to be improved, the business performance is not outstanding enough, there are still certain risks in operation, and the ability to control risks is average. Secondly, the company's institutional system is imperfect, and its internal control, internal audit, external audit, requires further improvement. Thirdly, the company has two risk indicators that fail to meet the regulatory compliance requirements.

Level 4: Firstly, the company's current management level is not high, and there is still much room for improvement in operating performance. The company has significant risks in the business process, and its ability to control risks is weak; Secondly, the company's institutional system is imperfect, and its mechanisms such as internal control, internal audit, and external audit are insufficient to meet the company's development needs. Thirdly, the company has three risk indicators that fail to meet the regulatory compliance requirements.

Level 5: Firstly, the company's management level is weak, its operating performance is very poor, the company has more risks, and there is a severe lack of risk management and control capabilities; Secondly, the company has not established a corresponding system, and its mechanism such as internal control, internal audit, external audit is seriously lacking, which affects the company's regular operation; Thirdly, the company has four risk indicators that fail to meet regulatory compliance requirements.

2.2.4 Earnings ability

Earnings ability, an essential factor in evaluating the company's profitability and anti-risk ability, has a close relationship with risk management and can reflect the company's operating performance and lay the foundation for the company's future sustainable development. Financial leasing companies generally adopt the "high debt + slow return" business mode. For financial leasing companies, the key to preventing risks is to control the balance between debt and earnings so that earnings ability can measure the company's profit and quality. To measure the earnings ability of a company, we could use the asset profit ratio (net profit/total assets) (H.

W. Zhao & Zhu, 2017), and we could also use indexes such as the operating profit rate (operating profit/operating income), the return on total assets (net profit/ average total assets), return on net assets (net profit/net assets), net profit cash content (net cash flow from operating activities/net profit), and return on capital (total profit/total capital) (Xia et al., 2018). The operating profit rate measures the company's capability to obtain operating earnings using a certain operating cost. The return on total assets measures the company's capability to obtain profits using the operating assets. The return on net assets measures the company's capability of using their own capital to obtain profits. Net profit cash content measures the company's capability to collect money from operations.

The thesis selects two indicators to rate the earnings ability of financial leasing companies: return on assets and capital.

Level 1: The company has a strong earnings ability, with the return on assets being more than 1% and the return on capital being more than 10%. In the past three years, the company's net profit has increased significantly, and its business scale has been rapidly expanding.

Level 2: The company's earnings ability is good, with the return on assets between 0.7% and 1% and the return on capital being over 7%. There has been a certain increase in the company's net profit and business in the past three years.

Level 3: The company's earnings ability is average, with the return on assets between 0.3% and 0.79% and the return on capital being over 3%. The company's net profit and business scale in the past three years have been in a stable state.

Level 4: The company's earnings ability is not strong, and there is a loss. The return on assets is between 0% and 0.3%, and the return on capital is above 0. The company's net profit and business scale in the past three years have shown a trend of fluctuations.

Level 5: The company's earnings ability is severely insufficient, and the loss is severe. The company's net profit in the past three years has declined, and the business scale has been shrinking.

2.2.5 Liquidity

For financial leasing companies, the rent arrears of a single business may not bring substantial financial risks, but it may be risky or even catastrophic to the entire company's operations when the liquidity is insufficient. Therefore, liquidity is an important index to measure the financial risk and management of a financial leasing company. The company's liquidity can be considered from the debt matching degree, financing ability, debt solvency, and active debt

ability. The indicators for measuring the liquidity of financial leasing companies mainly include a current ratio (current asset/current liability), asset-liability ratio (total liability/total asset), current liability ratio (liquidity/total liability), borrowing ratio, long-term and short-term liability ratio, cash interest guarantee ratio.

The thesis selects the current ratio and current debt ratio to give ratings to the liquidity of financial leasing companies.

Level 1: The company's current ratio is above 25%, and the current debt ratio is below 25%, indicating that the company's liquidity and capital management capability are strong. Meanwhile, the company has sufficient funds with different maturities to meet the need for liquidity at present and in the future.

Level 2: The company's current ratio is between 17% and 25%, and the current debt ratio is between 25% and 50%, indicating that the company has a certain level of liquidity and capital management capability. Meanwhile, the company has a good source of funds, which can meet the company's needs at this stage.

Level 3: The company's current ratio is between 10% and 17%, and the current debt ratio is between 50% and 70%, indicating that the company's liquidity and capital management capability are insufficient. Meanwhile, the company lacks credible and sufficient sources of funds, which is challenging to meet the needs of liquidity at present and future moments.

Level 4: The company's current ratio is between 5% and 10%, and the current debt ratio is between 70% and 90%, indicating that the company's liquidity is insufficient and its capital management capability is weak. Meanwhile, the company has a large amount of liquid liability, which can seriously lead to the mismatch of company assets and liabilities.

Level 5: The company's current ratio is below 5%, and the current debt ratio is above 90%, indicating that the company has a high liquidity risk and payment difficulties are likely to occur. Once the company's financing environment suddenly changes, the capital chain may break, and the company's regular operation can be affected.

2.2.6 Sensitivity to market risk

Financial leasing company's sensitivity to market risk is an important indicator for evaluating their response to market risks. Part of the risks of financial leasing companies come from environmental factors such as exchange rates, interest rates, and price changes of leased properties. The ability to manage and control these risks determines whether the development of financial leasing companies is healthy or not. Financial leasing company's sensitivity to

market risk can be calculated by "(non-current assets-non-current liabilities)/total assets" (H. W. Zhao & Zhu, 2017), or through indicators such as the matching degree of interest rate, the impact of exchange rate changes on cash, and leasing residual volatility. Among them, the matching degree of interest rate can be calculated by "(long-term assets-long-term liabilities)/total assets". The higher the calculation result is, the more significant the impact of interest rates is. The greater effect of exchange rate changes on cash indicates a greater influence of exchange rate fluctuations on the company, which means higher risks. The thesis uses the matching degree of interest rate to evaluate the financial leasing company's ability to manage market risks. There are five rating standards.

Level 1: The matching degree of interest rate is within 10%, indicating that the financial leasing company has strong market risk management and control capability and can effectively manage market sensitivity. The company's performance and costs will not be adversely affected by market factors.

Level 2: The matching degree of interest rate is between 10% and 20%, indicating that the financial leasing company has specific market risk management and control capability and a certain ability to reflect market factors. The market factors have little bad impact on the company's performance and costs.

Level 3: The matching degree of interest rates is between 20% and 30%, indicating that there is still room for improvement in the financial leasing company's ability to control market risks, and the company's performance and costs are more likely to be affected by unfavorable market factors.

Level 4: The matching degree of interest rate is between 30% and 40%, indicating that the financial leasing company has insufficient ability to control market risks and fluctuations in the market, which may seriously impact the company's performance and costs.

Level 5: The matching degree of interest rate is between 40% and 50%, indicating that market risks severely threaten the regular operation of the financial leasing company, and the company's risk management capability is weak, and external capital support is required.

2.2.7 Comprehensive evaluation analysis

In 2005, China Banking and Insurance Regulatory Commission published the Internal Guidelines on Regulatory Rating of Commercial Banks (for Trial Implementation), which was then officially released as the Measures for the Regulatory Rating of Commercial Banks after being revised in 2021. The Measures proposed a new "CAMELs+" regulatory rating system,

which added the data governance dimension and the institutional differentiation dimension on the basis of bank rating system, capital adequacy (C), asset quality (A), management (M), earnings ability (E), liquidity risk (L), sensitivity to market risk (S) and information technology risk (I), the original "CAMELS+" dimensions. Commercial banks should be comprehensively conducted from the above nine dimensions. Each dimension has both quantitative and qualitative factors, as shown in Table 2.3.

Table 2.3 Regulatory rating system of commercial banks

Dimension	Wight
Capital adequacy	15%
Asset quality	15%
Management	20%
Earnings ability	5%
Liquidity	15%
Sensitivity to market risk	10%
Data governance	5%
Information technology risk	10%
Institutional differentiation factor	5%

Based on evaluating the above 9 dimensions' indicators, the weighted average method is adopted to comprehensively calculate the individual ratings to obtain the final rating results. The rating results can be divided into 7 grades and 13 levels. As shown in Table 2.4, grade 1 has two levels, and each of grades 2-4 has three levels.

Table 2.4 The regulatory rating of commercial banks

Grade	Level	Point
Grade 1	1A	[95，100)
	1B	[90，95）
Grade 2	2A	[85，90）
	2B	[80，85）
	2C	[75，80）
Grade 3	3A	[70，75）
	3B	[65，70）
	3C	[60，65）
Grade 4	4A	[55，60）
	4B	[50，55）
	4C	[45，50）
Grade 5		[30，45）
Grade 6		below 30
Grade S		

Higher grades require a higher degree of supervision. Grades 1-2 indicate normal, grades 3-4 indicate having risks, and grades 6-S indicate high risks. For financial leasing companies, their rating standards should refer to the regulatory rating standars of commercial banks.

2.3 Pricing strategy of financial leasing

2.3.1 Overview of financial leasing product's pricing

Generally speaking, the pricing of financial leasing products refers to the formulated price that can meet the leasing company's requirements of profitability and safety and satisfy the multiple needs of the lessees. The pricing of financial leasing is obtained by precise calculation of the income that a specific financial leasing project can generate in the entire business process and all the costs and various risks that the company has to bear (Z. Y. Lu, 2014). The combination of capital and assets in financial leasing determines the complexity and diversity of its products and indicates the flexibility and innovation of its product pricing mechanism.

As an innovative financial product, an investment method, a trading method, and a particular form of credit, financial leasing products not only have the characteristics of financing but also undertake other functions, such as helping the lessees to improve liquidity, revitalize stocks, adjust asset structure, increase return on capital. (Beattie et al., 1998; Su, 2011; L. C. Zhang, 2012). Therefore, when pricing a financial leasing product, the company should not only consider the lessor's time value and risk quantification but also take the lessee's special needs and additional functions of the project into account to finally determine its pricing strategy. The same leasing products of the same company may have different pricing plans due to the various needs and conditions of the lessees. The specific pricing plan should be personalized and unique (Ye, 2018).

In China, financial leasing institutions include financial leasing companies, domestic-funded financial leasing companies, and foreign-funded financial leasing companies. Before April 2018, these companies were approved and supervised by the Ministry of Commerce, the State Administration of Taxation, and the China Banking Regulatory Commission. From their perspectives, these approval and regulatory departments categorize financial leasing institutions into different industries and divide financial leasing projects into different natures. As a result, the regulatory requirements that financial leasing institutions refer to and comply with are not the same, which shows the diversity and complexity of the financial leasing business.

In summary, before conducting research on the pricing mechanism, it is necessary to sort out the main profit models of financial leasing and the specific pricing features and principles of financial leasing products.

2.3.2 The profit models of financial leasing

Financial leasing companies usually determine their business models according to their industry characteristics, market positioning, transaction structure, and customer requirements, forming their profit models. According to the income structure of financial leasing companies, there are five profit models.

1. Interest income

Interest income is the net income achieved by financial leasing companies through capital and business such as financial leasing, equipment loans, installment sales, operating leases. (Kong et al., 2012). Financial leasing companies usually bear loan interest to obtain capital through methods such as bank loans. Therefore, financial leasing companies also need to consider their loan interest when conducting the business. Only when the interest generated by the leasing business is higher than the loan interest can the interest difference be formed and income generated. Bank-linked financial leasing companies' interest-bearing assets include direct marketing, indirect marketing (cooperating with other suppliers), and purchasing assets from other institutions. The main product of bank-linked financial leasing companies in China is financial leasing, with the interest margin income being the primary source of income (L. Liu, 2016). In general, financial leasing companies can control risks by allocating capital and adjusting interest rates. For small and medium-sized enterprises, financial leasing companies can increase the interest rate according to the enterprises' credit ratings and operating conditions to reduce credit risks. Financial leasing companies can provide relatively low interest rates for enterprises with good asset conditions and credit ratings to ensure market share.

2. Residual value income

Residual value income refers to the price difference income obtained by the financial leasing company in the leasing business due to the recovery or re-leasing of the leased property (equipment). By using a relatively high depreciation rate, financial leasing companies can maintain a low net value of equipment on the books (Kong et al., 2012). When the leasing contract is terminated in advance, and the lessee chooses to purchase the equipment or re-lease the equipment at the market price, the leasing company can usually obtain a price higher than the book value, generating residual value income. Financial leasing companies that have a better understanding of the leased property (equipment) industry and market, or financial companies capable of refurbishing equipment, technological upgrades, and second-hand disposal can obtain more significant residual value income. For example, as a professional equipment manufacturer and system solution provider, IBM has obvious professional technical advantages.

IBM's financial leasing business mainly aims at IT equipment. The equipment depreciation comes from technological upgrades and users' higher requirements of the performance. As its equipment upgrades are complicated and continuous, IBM has a relatively high percentage of residual value income in its leasing business. The residual value income of a financial leasing company can effectively prevent and control the company's risks in the leasing business and become an important source of income for the company.

3. Service-oriented income

Service income refers to the revenue generated by providing related ancillary services for the lessee in the financial leasing business, including leasing fees, financial consulting fees, transaction commissions, combined service income. (Z. Q. Jiang, 2003; Kong et al., 2012). The leasing fee is the financial leasing company's expenses in purchasing the leased equipment for the lessee, such as employee salaries, travel expenses, office expenses. Usually, the leasing fee is not a fixed value as it is closely related to the leased property, lease contract, lease cost, value at risk, and lease model. A financial consulting fee is a fee obtained through consultation. Financial leasing companies can provide professional consulting services using their resources and professional knowledge based on the lessee's financing needs. Financial consulting fees can be charged by a fixed amount or by a certain percentage of the project amount. With the professional development of the financial leasing business, financial consulting fees are becoming an essential source of income for financial leasing companies. Transaction commission is another kind of service income. As the buyer and investor of the leased property (equipment), the financial leasing company can realize the return of sales payments by expanding the market share of equipment manufacturers or suppliers. The financial leasing company can then collect sales commissions or purchase discounts and commissions on insurance and logistics. Transaction commission, the income obtained by providing services in the transaction, is also an important source of income for the financial leasing company. The combined service income usually aims at financial leasing companies with a manufacturer background. The company can provide the lessee with professional combination services such as consumables, accessories, training, and maintenance in the lease contract, and then obtain certain benefits from it.

4. Operational income

Through capital operation, financial leverage, product portfolio services, and scale effects, financial leasing companies can increase the efficiency of fund-raising and operation, and generate operational income (C. M. Zhang, 2013). Operational income mainly comes from four sources. Firstly, the leasing rate of financial leasing companies is often higher than the bank

loan interest rate in the same period. As a fund operation platform, financial leasing companies could refer to the existing contracts and business forecasts of the future and coordinate the time of equipment purchase, external payment, rent return, loan repayment. Financial companies could obtain the difference income of fund operation by the reasonable arrangement of new financing period and amount. Secondly, financial leasing companies usually have multiple sources of funds. If the funds in the leasing business belong to its funds, the company can obtain higher income than the loan interest rate during the same period. If part of the funds in the leasing business comes from its funds and part of the funds comes from bank loans, the leasing company could take advantage of the financial leverage effect, as its funds can obtain higher lease interest than the bank loan interest rate, and the loan can also get interest margin income. Thirdly, financial leasing companies can cooperate with other financial institutions to develop more products and services in accelerating fundraising, improving asset turnover, diversifying risks, and combining profit models to obtain benefits. Fourthly, financial leasing companies can control risks within a specific range. By incorporating many funds and forming high-debt scale operations, financial leasing companies can reduce the cost of capital, increase capital utilization, and then obtain higher returns.

5. Risk benefits

For financial leasing companies, risks and returns always coexist. A higher return is accompanied by higher risks (J. Yang, 2005). The purpose of risk control and product pricing is to maximize the company's returns when the risk is fixed and minimize the company's risk when the return is guaranteed. Financial leasing companies can manage risks and returns through contingent rents and the issuance of convertible lease bonds. Contingent funds refer to the varied rents calculated based on influencing factors except for time (such as market share, product usage, price index). When a financial leasing company signs a leasing contract, both parties can agree that when the lessee's performance reaches a specific scale or when the price level changes to a certain extent, the lessee should pay the leasing company by a certain percentage or by other calculation methods. For the lessee, the financial leasing company bears the risk and shares the income of the leased property operation. For the leasing company, it means greater risks and possibly more significant benefits at the same time. The issuance of convertible lease bonds is a new investment method adopted by professional investment institutions to control risks and obtain returns. For some high-risk lease projects, financial leasing companies may make a contract and under certain conditions, the lessor can convert the unrealized lease claims into shares at the agreed price to obtain the value-added income by equity income or equity transfer after the project is completed.

2.3.3 Pricing characteristics and principles of financial leasing

2.3.3.1 Pricing characteristics of financial leasing products

With many years' development, the transaction structure and legal relationship of financial leasing products have become clear, and the system design has been standardized. Financial leasing integrates financing, trading, leasing, credit. The pricing strategy of financial leasing products needs to comprehensively consider their transaction characteristics, including factors such as lease principal, rent payment, lease interest rate, deposit, handling fee, and insurance. Therefore, financial leasing has the characteristics of comprehensiveness, difference, and flexibility (W. Jiang & Huang, 2010; Z. Y. Lu, 2014; R. Y. Wang & Sun, 2015).

1. Comprehensiveness of financial leasing pricing

Generally, the pricing of financial products mainly depends on interest rates and fees, which are relatively fixed in form. As a financial innovation product, financial leasing is a comprehensive product that combines trade and credit and integrates funds and assets. On the one hand, the pricing of financial leasing products should base on the lessor's capital situation. On the other hand, unique pricing plans can be designed according to the lessee's demands. So, instead of being a fixed paradigm, the pricing plan of financial leasing is highly individualized.

2. Difference of financial leasing pricing

The pricing of financial products usually sets a single price based on the characteristics of sales transactions. The pricing strategy of financial leasing products needs to comprehensively consider the transaction characteristics and pricing characteristics of trading, financing, and leasing. In specific pricing plans, the industry characteristics of the leased property, the deposit in the leasing transaction, the method of fund delivery, and the fees and time in the financing and leasing process should all be considered.

3. Flexibility of financial leasing pricing

For the same subject matter and the same lessee, financial leasing companies can design different pricing plans. In the pricing plan of a leasing business, there are many elements to be involved, such as cost, leasing fee, leasing term, leasing repayment arrangement, security deposit, handling fee, retention price, expected rate of return. (Clapham & Gunnelin, 2003; Ye, 2018). Each element change will affect the actual income of the financial leasing company. For financial leasing companies, the pricing plan is often based on its income. Under the circumstance that the company's revenue remains unchanged, the financial leasing company can formulate many pricing schemes according to the actual situation of different suppliers and lessees. The main aim is to meet the comprehensive needs of the lessee to the greatest extent

and help the lessee reasonably use the resources in hand to obtain the optimal resource allocation.

4. Multi-direction of financial leasing pricing

Unlike the one-way pricing of general commodities and financial products, the pricing of financial leasing products is multi-directional, requiring multiple parties' consideration. When pricing products, financial leasing companies should consider their benefits, risks, costs, and the lessee's operating conditions, credit ratings, benefits and risks, even the related parties, such as the insurance companies and the suppliers. Different pricing strategies are given to various lessees to achieve a win-win situation for multiple parties.

5. Additional function of financial leasing pricing

The pricing of financial products reflects its financing function, but financial leasing products, besides the functions of funds and assets, also have financial optimization functions such as: helping the lessee adjust the short-term and long-term liability, increasing liquidity, planning taxation, and adjusting the asset structure and profit. What's more, financial leasing can also help lessees update technology and equipment, avoid invisible loss of equipment, and enjoy accelerated equipment depreciation. In formulating the price plan, these additional functions are also factors that financial leasing companies need to comprehensively consider according to the actual situation of the lessees.

2.3.3.2 Pricing principles of financial leasing products

As stated by R. H. Liu (2011) and based on the primary profit model and pricing characteristics of financial leasing, the pricing of financial leasing products follows the following four principles.

1. Normativeness

Normativeness is an essential requirement for all business activities. On the one hand, compliance with normative principles includes international guidelines, laws and regulations, policies, industry standards. On the other hand, compliance with normative principles includes optimizing the company's governance structure, decision-making processes, standardized operations. In financial leasing, suppliers, lessors, and lessees must conduct business activities following the corresponding regulations. Although product pricing has greater flexibility, it should also strictly abide by the bottom line of laws and business ethics and comply with related regulations.

2. Objectiveness

When choosing an industry and a business direction, financial leasing companies need to

follow the guidelines of national policies and the rule of market trends and keep a close eye on the adjustments and changes of the industrial structure. In that way, the companies can adjust their investment industries and investment targets to ensure that the company's development keeps the same pace with the country and the industry. Meanwhile, when conducting leasing business and formulating business objectives, financial leasing companies should consider not only the company's short-term interests but also the company's long-term interests and stable development. Financial leasing companies often invest in fixed assets, which belong to medium and long-term investment activities. In financial investment activities, risks should be taken into consideration. Financial leasing companies can diversify risks by diversifying the business, innovating the cooperation models, and increasing the service value. Consequently, the diversity of the company's income sources and the stability of the company's development can be ensured. Therefore, when financial leasing companies develop their business, they need to plan a multi-dimensional, long-term, and short-term goal system, from which they can decompose short-term goals from long-term goals, decompose specific business goals from general goals, and optimize product structure.

3. Lower limit of cost

The pricing strategy of financial leasing companies determines their ability to make profits, as appropriate product pricing can ensure their profits and improve market competitiveness. When pricing leasing products, it is necessary to ensure that its income is not lower than the sum of the acquisition cost, financial expenses, and expected revenue. Among them, the acquisition cost is paid by the financial leasing company to the supplier, which is the lower limit of the financial leasing company's minimum cost. The lower limit formulated by financial leasing companies through cost control and optimization is the control of operational risks and the fundamental guarantee for reasonable pricing.

4. Demand-oriented principle

When pricing products, financial leasing companies should not consider only their own cost and profit factors but also consider the overall situation of the lessee, such as industry characteristics, product characteristics, operating conditions, market factors. The leasing products' pricing models being single and rigid is a major shortcoming of the current financial leasing industry (Clapham & Gunnelin, 2003; W. Liu & Zhu, 2007). When pricing a product, financial leasing companies ought to fully consider the individual needs of each lessee (enterprise), and a personalized pricing plan should be developed as claimed by their different needs. A customized pricing strategy can bring targeted added value to the lessee and bring

diversified profit methods to the leasing company and diversify its operational risks.

2.3.4 The pricing model of financial leasing products

2.3.4.1 Factors influencing the pricing of financial leasing products

When formulating the pricing plan of a financial leasing product, 12 elements need to be considered: financial leasing principal, margin, handling fee, insurance fee, leasing rate, leasing rate calculation method, leasing term, rent payment amount per period, rent payment interval, rent payment time per period, rent payment method, nominal price (Z. Y. Lu et al., 2017; Realdon, 2006). When negotiating pricing elements, the lessor and the lessee should consider the costs and risks while considering the profit. In addition to the principal of financial leasing, the establishment of other elements requires the participation of both parties.

For the lessor, when pricing a financial leasing product, the critical consideration is the cost and risk of the project, including the purchasing cost of the leased property, the loan interest and related expenses of the project, the risk cost, and the operation and management cost of the project. The lessor's income mainly comes from the rent, handling fee, and deposit of the leased property. Therefore, when the lessor is pricing a product, the factors to be considered include: the amount of principal, the amount of principal in Nth term, the acquisition cost, the acquisition cost in Nth term, interest income, interest income in Nth term, deposit, handling fees, risk costs, operation cost, operating costs in Nth term, expected revenue, expected revenue in Nth term, total rent, rental revenue in Nth term, leasing term.

For the lessee, the key elements to be considered when making financial leasing are the project's expected operating costs, tax expenditures, depreciation time, the amount of depreciation, as well as the expected operating income brought by the leased property. Therefore, the factors to be considered by the lessee include expected income in Nth term, initial investment, the cost in Nth term, depreciation period, depreciation amount in Nth term, tax rate, tax expenditure in Nth term.

The pricing of financial leasing products is not only affected by the internal factors of the lessor and the lessee; it is also affected by external factors such as the macroeconomic environment, national policies, industry changes, and market demand. However, the pricing of financial leasing products is mainly determined by negotiating between the lessor and the lessee. Therefore, the research on pricing financial leasing products mostly starts from the perspective of the lessor and the lessee.

2.3.4.2 Pricing model of financial leasing products

In the pricing process, financial leasing products have long time, large amount, and installment characteristics. Although the pricing strategy of financial leasing products derives from financial products, it differentiates from traditional financial products. The essence of financial leasing product pricing is to seek the optimal allocation of assets and find the balance of risk and return. There are abundant foreign research on the pricing of financial leasing products, and this research has formed some pricing method systems, with capital asset pricing model, three-factor model, cash flow discounting model, and option pricing model as the representatives.

1. Capital asset pricing model

Based on the asset portfolio theory and capital market theory, the capital asset pricing model (CAPM) was proposed by Sharpe (1964). CAPM mainly studies the quantitative relationship between the expected rate of return and risky assets and the formation of equilibrium prices (Dempsey, 2013). When the market reaches equilibrium, the marginal cost of risk remains unchanged, and the marginal effect of any investment that changes the market portfolio is the same; that is, the compensation for adding one unit of risk is the same. The formula of the capital asset pricing model is:

$$\boldsymbol{E(r_i) = r_f + \beta i_m (E(r_m) - r_f)} \tag{2.1}$$

In this formula, $E(r_i)$ is the expected return rate of asset i; r_f is the risk-free interest rate; βi_m (Beta coefficient) is the systemic risk of asset i; $E(r_m)$ is the expected market return rate of market m; $E(r_m) - r_f$ is the market risk premium, which is the difference between the expected market rate of return and the risk-free rate of return. CAPM is used in asset evaluation, capital cost budgeting, and resource allocation (P. Huang & Wei, 2006).

2. Three-factor model

Ross (1976) proposed the arbitrage pricing theory (APT Theory). Like CAPM, APT is a model under equilibrium. However, CAPM is a single-factor model, while APT is based on a multi-factor model. In 1993, Fama and French proposed the Fama and French three-factor model based on the APT theory (Fama & French, 1993). The three-factor model combines the risk factors with other influencing factors in the CAPM model (such as the market value of listed companies, book-to-market value ratio, and price-to-earnings ratio) to transform APT into a model that can be applied in practice (Brennan et al., 2001). The three-factor model holds that the excess return rate of an investment portfolio can be explained by market portfolio $E_m - R_f$, market value factor (SMB), and book-to-market value ratio factor (HML). The formula is:

$$\boldsymbol{E(R_{it}) - R_{ft} = \beta_i[(E(R_{mt} - R_{ft})] + s_i^E(SMB_t) + h_i^E(HML_t)} \tag{2.2}$$

Among them, R_{it} represents the rate of return of asset i at time t; R_{ft} represents the risk-free rate of return at time t; R_{mt} represents the market rate of return at time t; $E(R_{mt} - R_{ft})$ is the market risk premium; SMB_t is the simulated portfolio return of size factor at time t (Small minus Big); HML_t is the simulated portfolio return of the book-to-market factor at time t (High minus Low). β, S_i, and h_i are the coefficients of the three factors.

3. Discounted cash flow model

In 1986, Alfred Rappaport proposed the discounted cash flow model (DCFM), also known as the Rappaport model (Rappaport, 1986). The model converts the estimated future cash receipts and expenditures into the current value and is the primary valuation and investment judgment method. The cash flow in DCFM refers to free cash flow (FCF), which is the cash flow that can be paid to all liquidators after deducting necessary capital expenditures, working capital, and taxes. FCF can be calculated through the net present value (NPV) and the internal rate of return (IRR). NPV is to convert the net cash flow throughout the project into the sum of the equivalent present value according to the predetermined target rate of return. IRR is the actual rate of return based on the current value of a long-term investment plan.

The discounted cash flow model focuses on the time value of funds, that is, to decide whether to invest in a project by evaluating the changes in the value of funds over time. For financial leasing companies, the assessment and selection of leasing projects can be regarded as investment behavior. In applying the discounted cash flow model, the discount rate is an important influencing factor that can be expressed as the sum of the risk-free interest rate and the risk compensation rate. It reflects not only the return of funds, but also the return of funds management (Q. Z. He et al., 2008). In financial leasing, expected income and discount rate will affect the pricing of leasing products, so the cash flow discount model is an essential theoretical basis for the pricing of financial leasing products.

4. Option pricing model

In 1973, the European option B-S model proposed by economists Fisher Black and Myron Scholes was made public. Option is a risk management tool that can effectively manage risks through a correct valuation of options. The option pricing model is based on the idea of hedging portfolio, and investors can guarantee returns by establishing a combination of options and the underlying stocks. The option price is the unique factor in the contract that changes with market supply and demand, and the profit and loss of both parties change due to changes in the option price. Therefore, the determination of the option price has also become the key core of the

option transaction (T. Sha & You, 2013). On this basis, several versions of the core model, such as the Jump-Diffusion and Stochastic Volatility model, were developed. The pricing formula of the European option B-S model is:

$$\boldsymbol{C = S \bullet N(d_1) - Le^{-rT} N(d_2)} \tag{2.3}$$

Among which:

$$\boldsymbol{d_1 = \frac{ln\frac{S}{L} + (r + 0.5 \bullet \sigma^2)T}{\sigma \bullet \sqrt{T}}}$$

$$\boldsymbol{d_2 = \frac{ln\frac{S}{L} + (r - 0.5 \bullet \sigma^2)T}{\sigma \bullet \sqrt{T}} = d_1 - \sigma\sqrt{T}}$$

Where C represents the initial reasonable price of the option; L represents the delivery price of the option; S represents the current price of the financial asset being traded; T denotes the validity period of the option; γ represents the continuous compounding risk-free interest rate; δ^2 represents the annualized variance, and N( ) represents the cumulative probability distribution function of the normally distributed variable $\left(\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{d_n} e^{-\frac{x^2}{2}}\,dx\right)$.

In addition to the classic pricing models, asset pricing research based on market micro-structure theory is developed, and the corresponding pricing models are implemented. For example, the Liquid Asset Pricing Model (LA-CAPM) integrates liquidity and other micro-structure factors into the asset pricing model to study the relationship between liquidity and asset pricing (C. R. Yan, 2012). The Consumer Asset Pricing Model (CCAPM) is derived through optimization problems of consumers, and the Liquidity and Asset Pricing Model is a research model formed by combining the three-factor model of liquidity cost factors.

Moreover, there is also research on the pricing of behavioral assets. For example, Shefrin and Statman proposed the Behavioural Asset Pricing Model (BAPM) in 1994, which divides investors into information traders and noise traders. Information traders are “rational investors” and do not have cognitive errors and mean-variance preferences, so information traders are suitable for the capital asset pricing model (CAPM). Noise traders are prone to cognitive errors and do not have a strict mean variance preference, so noise traders often deviate from the Capital Asset Pricing Model (CAPM). When the transaction subject is an information trader, the market is efficient, but when the noise trader occupies the central position of the transaction, the market is inefficient (Brown & Cliff, 2004). The behavioural asset pricing model (BAPM) embodies behavioral finance's basic concepts, accepts market effectiveness, upholds the actors’ limited

rationality, control, and self-interest (G. H. Xu, 2013).

2.3.4.3 The main pricing model of leasing products in China

China's financial leasing industry has a relatively late start, and the market still has many imperfections. There are relatively few domestic researches on the pricing of financial leasing products. Domestic research on the pricing of financial leasing products mainly includes cost-plus pricing model, benchmark interest rate plus point model, customer profit analysis model, option pricing model and RAROC (Risk-Adjusted Return On Capital) which takes the risk-adjusted ratio of income to capital as the basis for decision-making.

1. Cost-plus pricing model

In the cost-plus pricing model, the product's sales price must compensate the product cost and obtain a reasonable profit. The cost-plus pricing model, which is a traditional financial product pricing model, sets the price of financial products from the perspective of the financial leasing company. In this model, the lessor has the dominant power to determine the price, and the lessee can affect the mark-up rate (J. H. Han & Gan, 2012). The price of financial products determined by the cost-plus pricing model includes the cost of capital, non-capital operating costs, risk premium, and expected profit (Z. Y. Lu, 2014).

The most significant advantage of the cost-plus pricing model is its simple pricing. The model doesn't need historical marginal cost and marginal revenue information, which makes it convenient to cooperate with lessees, suppliers, and other partners, being accessible for financial leasing companies to recover costs and realize profits. However, the cost-plus pricing model also has its shortcomings. First of all, cost-plus pricing is mainly applicable to the pricing of a single financial product, but there are often more complicated business relationships between financial leasing companies and customers, such as continuous cooperation and leasing of multiple financial products, which is not conducive for the financial leasing agency to establish a multi-dimensional and good relationship with its customers. Meanwhile, the cost-plus pricing model does not consider the price elasticity of product demand and industry competition. Instead, it mainly considers the profit from its perspective, which can easily lead to the deviation of product pricing from the actual market and loss of market competitiveness. In addition, when using the cost-plus pricing method, it is necessary to calculate the capital cost, non-financial operating cost, and risk premium simultaneously, which is difficult for many financial leasing companies to operate.

2. Benchmark rate plus point pricing model

The benchmark rate plus point pricing model is currently the most widely adopted pricing

model in the international banking industry. The model's benchmark rate refers to the lowest interest rate for providing loans to high-quality and reputable customers. The first step of benchmark rate plus point pricing model is to select a specific benchmark interest rate as the base price. After conducting credit evaluation on different customers, the financial leasing company would add the risk points of the financial institution to the base price according to factors such as credit ratings and risks. There are usually two methods for determining the interest rate of the benchmark rate plus point pricing model: base rate addition and base rate multiplication. The core formulas are given below:

Base rate addition method: Loan rate = base rate + risk premium points

Base rate multiplication method: Loan rate = base rate * risk premium multiplier

The advantage of the benchmark rate plus point pricing model is that the model is simple to operate and market-oriented. By adopting this model, the product prices set by financial leasing companies can keep up with market changes and are flexible and competitive (J. L. Zhang et al., 2006). However, the benchmark rate plus point pricing model also has its shortcomings. First of all, the choice of the benchmark rate determines the rationality of the pricing model. At present, China’s interest rate marketization is still in its infancy and is not mature enough, so simply selecting a benchmark rate plus point is unreasonable. Secondly, the benchmark rate plus point pricing takes complete account of market competition factors but ignores the comprehensive consideration of its capital structure, capital cost, and non-financial operating costs. Because of that, the product market may perform well, but the product profit is insufficient, or even suffer from a loss.

Moreover, in the benchmark interest rate plus point pricing model, a high-risk premium would lead to a high product price. On the one hand, it reduces the market competitiveness of the product. On the other hand, it increases the default probability of high-risk customers, leading to higher risk for financial leasing companies.

3. Customer profitability analysis - pricing model

The customer profitability analysis - pricing model sets the right price by fully considering the relationship between the customer and the leasing company and comprehensively analyzing the business with the customer in the past, present, and future. In the customer profitability analysis - pricing model, the total cost and total revenue of the business with specific customers as well as the expected profit of the leasing company need to be considered. The comprehensive business revenue is the comprehensive business income minus the comprehensive cost. The customer profit analysis - pricing model is a customer-centered pricing model which coordinates the business with customers in terms of time and space. Therefore, the model is a

comprehensive pricing rather than a single financial product pricing (B. Yu & Zheng, 2005). The customer profit analysis - pricing model can realize personalized differential pricing and service additions according to the customer's business contribution or profit contribution to the company, conducive to establishing a full-scale and good relationship between the company and high-quality customers, improving product competitiveness, and enhancing market position.

The customer profitability analysis - pricing model, also has shortcomings. On the one hand, the customer profitability analysis - pricing model is more suitable for large customers with more business transactions because this model relies on considering the customer's past, present, and possible future cooperation businesses to calculate the total cost and total revenue of the leasing company. While for the company's new customers and potential customers, the customer profitability analysis - pricing model is hard to apply. On the other hand, the customer profitability analysis - pricing model has higher requirements on leasing companies' cost calculation and allocation. The leasing company should not only adopt the method of "calculated by product", but also adopt the method of "calculated by customer". Moreover, the leasing company should calculate the capital cost and the non-financial operating costs and benefits of the current business and calculate the related costs and benefits of the previous or future business. The adoption of the customer profit analysis - pricing model requires to have strong pricing capabilities and a complete pricing system, including an information collection system, customer analysis system, risk assessment system, cost accounting system, and credit decision-making systems, generating vast costs for the financial leasing companies and increasing management costs.

4. RAROC pricing model

As a risk management concept and method, RAROC (risk-adjusted return on capital) pricing model was proposed by the Bankers Trust New York Corporation in the United States in the 1970s. The RAROC theory holds that when banks or financial institutions evaluate their profitability, they also need to consider what risks their profitability is based on (Weert & Frans, 2011). RAROC takes the risk-adjusted ratio of income to capital as the basis for decision-making (Lisa & Lee, 2002), which clarifies the impact of risk control on the operating efficiency of financial institutions and emphasizes the effect of risk-adjusted income in judging the efficiency of operation and management. RAROC is a risk-adjusted financial evaluation index, and it is also the primary management method used by international banks to make investment decisions and loan risk pricing (Bishop, 2007).

There are two basic calculation formulas for the RAROC model:

$$\text{RAROC} = \text{Risk Adjusted Return (RAR)} / \text{Economic Capital (EC)}$$

$$\text{RAROC} = (\text{net income} - \text{operating costs} - \text{expected loss}) / \text{economic capital}$$

where,

expected loss = risk exposure * default probability * default loss rate;

economic capital = loan position * standard deviation of the default rate.

Through the above calculations and the comparisons of the RAROC value with the lowest expected return rate by the leasing company, the price of the financial leasing product can be determined, and whether to invest in the leasing business can be decided. The RAROC pricing model can avoid the arbitrariness of traditional leasing product pricing models because the model fully considers the risk of leasing funds and determines the price of leasing products based on the return rate of risk capital. Meanwhile, adopting the RAROC pricing model can avoid using financial profit indicators as the standard, which would cause a time misalignment between the profit target and potential loss, so that the leasing company's risk control and financial income can achieve a synergy and stable development.

The RAROC pricing model also has shortcomings. Using the RAROC model requires a professional credit risk rating system to assess the magnitude of expected and unexpected losses. Currently, China does not have an internationally recognized authoritative rating agency, so the ratings of commercial banks are usually used for rating. Due to the imperfections of commercial banks' data and rating results, the application of the RAROC model by financial leasing companies is restricted (X. L. Yang, 2006). Many financial leasing companies do not have a mature condition to use the RAROC model because they have to refer to the historical data of risks, calculate the cost of funds, the expected and unexpected losses, and they have to be equipped with a systematic financial and risk management system (Guan, 2008), which implies a consistent challenge for the leasing companies.

In addition to the above pricing models, Chinese researchers are also actively exploring and constructing pricing models for financial leasing products. For example, Z. Y. Lu et al. (2017) have quantitatively studied the current leasing pricing plans based on the analysis of 727 leasing projects. They focus on the problems such as "failing to fully consider the differences in industries and the unity of rent payment methods", and construct a pricing model employing mean and quantile regression methods. By using capital asset pricing model as the pricing idea and by taking cost plus point pricing method as the basis, Z. G. Wu (2012), constructed a suitable risk pricing model for China's financial leasing business through analyzing various risks and citing the *New Basel Capital Accord*. Wu's pricing model is based on three assumptions: all of the commitment clauses are irrevocable; the leasing service process is random; the time and consequences of default are random. Wu's pricing model proposed that

the pricing of financial leasing products should include the cost of capital, operating costs, and risk premiums and should reflect the target income requirements. Meanwhile, the pricing of financial leasing products should consider business tax, income tax, national industrial policies, and environmental factors for economic development in various domestic regions.

In general, there are still some shortcomings in the pricing model of China's leasing products. Firstly, the pricing system for leasing products is not completed yet. Currently, the information collection system, risk management system, accounting system, are still lacking, and customer defaults data and customer defaults losses data cannot be fully collected. It is difficult to accurately calculate the amortized cost and risk premium of leasing products. Secondly, the pricing of leasing products is one-sided. Thirdly, the policies related to the pricing of leasing products are lagging.

2.4 New energy commercial vehicles and financial leasing

2.4.1 Overview of new energy commercial vehicle financial leasing

The new energy commercial vehicle industry in China began in the early 21st century. In 2001, research projects on new energy commercial vehicles were included in the national "863" major scientific and technological project during the "Tenth Five-Year Plan". At the beginning of the "Eleventh Five-Year Plan", China put forward the strategy of "Energy-saving and new energy commercial vehicles". During the "Twelfth Five-Year Plan", China's new energy commercial vehicles formally entered the stage of industrialization and received strong support from national policies. During the "Thirteenth Five-Year Plan", new energy commercial vehicles' strategic status has been strengthened again, and new energy commercial vehicles have transitioned to an important stage of market-oriented development. With the improvement of key technologies such as the charging time and cruising range of new energy commercial vehicles, with the popularization of basic supporting facilities such as charging piles, the development prospects of new energy commercial vehicles are regarded as highly optimistic. The financial leasing business of new energy commercial vehicles is developed based on the traditional car leasing business and with the rise of new energy commercial vehicles. According to the statistics, the overall penetration rate of China's auto finance is about 38%, and financial leasing only accounts for 2%. The financial leasing of new energy commercial vehicles in China is still in its infancy, and there are few related research projects and publications. The following section would sort out the concept, characteristics, and functions of new energy commercial

vehicle financial leasing.

2.4.1.1 The concept of new energy commercial vehicle financial leasing

According to the *Regulations on the Access Management of New Energy Vehicle Manufacturers and Products* implemented by the Ministry of Industry and Information Technology in July 2009, new energy commercial vehicles refer to the vehicles that use unconventional vehicle fuels as power sources (or use conventional vehicle fuels and adopt new on-board power devices), integrate advanced technologies in vehicle power control and driving, with advanced technical principles, new technologies, and new structures. new energy commercial vehicles include hybrid vehicles, battery electric vehicles (BEV, including solar vehicles), fuel cell electric vehicles (FCEV), hydrogen engine vehicles, and other new energy commercial vehicles (such as high-efficiency energy storage, dimethyl ether). Hybrid vehicles refer to vehicles that use traditional fuels and are also equipped with electric motors/engines to improve low-speed power output and fuel consumption, including gasoline hybrid vehicles and diesel hybrid vehicles. Battery electric vehicles are vehicles that are driven by electricity. Fuel cell electric vehicles refer to vehicles that use hydrogen, methanol, as fuel, generate electricity through chemical reactions, and are driven by electric motors. Hydrogen-engine vehicles are vehicles that use hydrogen engines as power sources.

According to the American Consumer Bankers Association, vehicle financial leasing is defined as a method to realize the purchasing and using of vehicles through providing various interest market financing products and the corresponding value investment. Financial leasing takes individuals, companies, governments, and other consumer groups as the object and is based on the ability to obtain future income and historical credit. According to the *Administrative Measures for Auto Finance Companies* issued by China Banking Regulatory Commission in January 2008, vehicle financial leasing refers to the rent-collecting transactions that use vehicles as the subject of leasing, and rent the vehicles to the lessees as agreed in the contract after the lessees select and approve the suppliers.

Using new energy commercial vehicles as the subject of leasing, financial leasing companies first purchase new energy commercial vehicles from the suppliers according to the lessee's choice of products, services, and suppliers. Then, the financial leasing companies provide the lessees with the new energy commercial vehicles for possession or using in accordance with the contract. Lastly, the financial leasing companies collect rent from the lessee. The whole process is called new energy commercial vehicle financial leasing. The lessees usually pay the rent monthly. When the leasing contract of the vehicle expires, the lessee can

obtain ownership of the vehicle by paying off the relevant payment.

2.4.1.2 The characteristics of new energy commercial vehicle financial leasing

New energy commercial vehicle financial leasing is different from the bank installment loans and operating leasing in auto finance (D. X. Hu & Wang, 2016; Sui, 2010).

Financial leasing and bank installment loans both obtain the use rights of vehicles through installment payments, which can ease the pressure of purchases and capital demands, and both show the relationship between credit rights and debts. For financial leasing, a transaction carrier is a physical object such as vehicles, with the form being "assets", and the transaction structure being at least three parties and two contracts. While for bank installment loans, the transaction carrier is currency, with the form being "financing", and the transaction structure being buyers and sellers, sales contracts, and loan contracts. According to F. Y. Liang (2005), Xie (2018), and other scholars, the specific differences between financial leasing and bank installment loan are shown in Table 2.5.

Table 2.5 Comparison between financial leasing and bank installment loan

	Financial leasing	Bank installment loan
Transaction carrier	Vehicle	Currency
Purchaser	Lessor	Client
Claims	Lessor	Lending bank
Property rights	Lessor	Client
Insurance beneficiary	Lessor	Client
Guarantee	Agent promises to buy back	Lease property mortgaged to bank
Preservation	Not participating in the bankruptcy of the tenant	Lending bank
Right of disposal	Lessor	Lending bank
Lien	After the rent is paid, the lessee has the priority to buy	Release the mortgage after the loan is settled
Risk control method	"Controlling things" as the main and "controlling people" as the supplement	"Controlling people" as the main and "controlling things" as the supplement
Manifestations	Realize the purpose of "financing" by means of "assets"	Use "financing" as a means, supplemented by mortgage, to achieve the purpose of "financing"

Operating leasing generally refers to all other leasing forms except financial leasing, including government official vehicle leasing, enterprise business vehicle leasing, private experience consumer vehicle leasing (W. Q. Han et al., 2014). Operating leasing is an "incomplete payment" leasing arranged to meet the lessees' needs for temporary or seasonal use of the vehicle. It is a pure form of leasing because instead of purchasing assets, the lessee leases the car only for short-term, temporary, or seasonal needs. Financial leasing is an alternative way to purchase a car in installment. Operating leasing only transfers the right to

use the vehicle for a specified period, and the risk still belongs to the lessor. The leasing term of financial leasing is longer, while the leasing term of operating lease is shorter. As stated in the research of Sui (2010), D. Ding and Jin (2013), the comparison between financial leasing and operating leasing is shown in Table 2.6.

Table 2.6 Comparison between financial leasing and operating leasing

	Financial leasing	Operating leasing
Leasing purpose	The lessee achieves the goal of "financing" through the method of "assets"	The lessee obtains the right to use the car
Leasing term	Medium to long term (usually 1-5 years)	Usually short term
Choice of leased property	The lessee chooses the supplier and car	The lessor buys the leased property and the lessee chooses to use
Calculation and amount of rent	Mainly includes elements such as leasing principal, security deposit, handling fee, insurance premium, leasing rate, leasing term. The total present value of the rent payment is greater than the amount of the one-time purchase of the leased property, which is a fully paid method	Mainly include elements such as the value of the leased property and the time of use; it is incomplete payment and the rent is low
Risk and responsibility	All risks and rewards related to asset ownership are transferred to the lessee	Failure to transfer all risks and rewards related to asset ownership
Lease management and maintenance	Lessee	Lessor
Flexibility	During the lease period, the lease is not allowed to cancel the contract, and the flexibility is poor	The lessee has the right to cancel the contract and withdraw halfway during the lease period, which is more flexible
Inventory	Leasing company out of stock	Lessor has inventory
Insurance	The lessor purchases according to the lease contract	Lessor purchase
Insurance beneficiary	Lessor	Lessor
Lien	Lessee can choose to buy	Return to lessor
Retention price	The leasing company retains the purchase at the "nominal price" (the market price equivalent to the residual value of the equipment)	Fair market price

From the comparison in the above table, it can be observed that the financial leasing of new energy commercial vehicles and traditional auto finance have similarities as well as differences. With high flexibility and low installment costs, the financial leasing model of new energy commercial vehicles can benefit stakeholders (such as auto sellers, leasing companies, and lessees), which can not only promote the sales of new cars and the development of second-hand cars, but also enhance the liquidity of the energy vehicle market.

Specifically, the financial leasing business of new energy commercial vehicles has five typical characteristics.

(1) High degree of risk security

In bank loans, banks are the owner of the creditor's rights and usually require the borrower to provide guarantees through real estate mortgages, valuable bond pledges, and third-party guarantees. The vehicle leasing business of financial leasing companies usually adopts the "1+N" payment model, that is, the first year's ownership of the vehicle belongs to the financial leasing company, and the customer only has the right to use it. After one year, the customer can choose to purchase or continue to lease or return, which controls the risks of financial leasing companies to a certain extent. If the lessee cannot repay the rent on time during the financial leasing period, the financial leasing company can terminate the lease contract and take back the leased vehicle as required, which is also a guarantee for the financial leasing company's business.

(2) Flexibility of financing

The bank's installment loans require repayment of principal and interest. In comparison, the financial leasing of vehicles is more flexible in the repayment cycle, and the lessee can either choose the increased way or decreased way to make repayments, which is more flexible. The amount of the bank loan is usually no greater than the price of the car, while financial leasing usually covers the expenses such as vehicle purchase tax and auto insurance, which gives the lessee more choices.

(3) Simple procedures and short time-consuming

Making bank loans means submitting various materials, going through checking levels, and involving procedures of insurance companies, notary offices, and other related parties before signing a formal contract. After all these procedures, the next thing to do is waiting for the bank to release the loan. In comparison, financial leasing is relatively simple. As long as the qualification review of the financial leasing company is satisfied, the relevant procedures can be completed based on the professional process of the leasing company. According to financial leasing brands such as Tangeche, JD Xiaobaiche, and Kuaitanche, customers often only need one day from submitting documents to picking up the car. Some financial leasing companies can complete all processes, from customer qualification review to car pickup, within two hours.

(4) Abundant additional services

According to the leasing contract, customers of financial leasing companies can choose different vehicle treatment methods at different periods of the vehicle. For example, after the first year of use, customers can choose to purchase, return, or continue to lease, which increases the customer's choice. In addition, for vehicle financial leasing, financial leasing companies usually provide various additional services, such as daily maintenance of vehicles, rescue, insurance services, annual inspection services, which clear the worries for customers when

purchasing and using the vehicles.

(5) Tax advantage

According to Accounting Standards for Business Enterprises No. 21-Leasing revised by the Ministry of Finance in 2018: if the lessee can reasonably make sure that the leased asset will be acquired at the expiration of the lease term, the leased asset should be depreciated during its useful life. This clause enables the lessee to accelerate the vehicle's depreciation and allows the lessee to include the allocated unconfirmed financing costs in the financial expenses during the leasing period, which can help the company save related tax expenses.

2.4.1.3 The business model of new energy commercial vehicle financial leasing

At present, China's new energy commercial vehicles mainly have three business models: the whole vehicle sales model, the leasing model, and the financial leasing model. Among them, the financial leasing model includes sale and leaseback, entrusted leasing, direct leasing, and "value-preserved repurchase + residual value leasing" (C. L. Zhang, 2017).

1. Direct leasing

The financial leasing company purchases new energy commercial vehicles from the supplier following the vehicle brand, model, and parameter configuration the lessee requires and signs a financial leasing contract with the lessee. After the agreed leasing term, the lessee can choose to purchase, return, or continue leasing the vehicle (the usual way is to pay the remaining money to buy the vehicle). When signing the leasing contract, the lessee must pay a certain percentage of the deposit and handling fee. The margin ratio is 20%-30% and 3%-5%, respectively, and the remaining payments are paid monthly or quarterly in installment. The total rent is often more significant than the price of a one-time purchase of the vehicle. Direct leasing is the most popular new energy commercial vehicle leasing method currently.

2. Entrusted leasing

In entrusted leasing model, the new energy commercial vehicle manufacturer or dealer acts as the principal and authorizes a financial leasing company to lease the vehicle to the customer (lessee) through financial leasing. The financial leasing company acts as the entrusted person to collect the rent from the lessee on behalf of the vehicle manufacturer or dealer, pay corresponding taxes and fees, and charge related handling fees. During the leasing period, the vehicle manufacturer or dealer (the principal) owns the property rights of the car, and the financial leasing company does not bear the corresponding risks.

3. Sale and leaseback

According to Administrative Measures for Financial Leasing Companies (China Banking

Regulatory Commission, 2014), the sales and leaseback refer to the financial leasings' form - the lessee sells its property to the lessor, signs a financial leasing contract with the lessor, and then leases the property back from the lessor. The sales and leaseback of new energy commercial vehicles mean that the financial leasing company purchases the customer's existing vehicle at an agreed price, leases it back to the customer in the form of a long-term lease, and then provides some agreed services. The sale and leaseback of new energy commercial vehicles reduce the customer management burden of financial leasing companies, the company's fixed asset ratio, and operating expenses, increasing capital efficiency, optimizing the company's asset structure, accelerating car depreciation, and reducing related costs.

4. Value-preserved buyback + residual value leasing

Value-preserved buyback is the auto manufacturer's promise that customers can buyback new energy commercial vehicles at an agreed price within a specific time period after the car is purchased to protect the residual value (Qi, 2008). Residual value leasing is the rent paid by the lessee every period. It is determined by the difference between the vehicle price at the beginning of the lease period and the vehicle's residual value at the end of the leasing period. The "value-preserved buyback + residual value leasing" model is a simple and efficient car-purchasing model. In the early stage of the new energy commercial vehicle market, the model can significantly alleviate customers' worries (in particular individual customers) and effectively help the large-scale promotion of new energy commercial vehicles. Therefore, the model is likely to become the primary mode in new energy commercial vehicle financial leasing in the future.

2.4.1.4 Advantages of new energy commercial vehicle financial leasing

Financial leasing, which achieves "financing" employing "assets", has become an important part of vehicle financial services. new energy commercial vehicles are still in the early stages of development. Due to imperfections in charging facilities, bottlenecks in the battery technology, and high product prices, the promotion of new energy commercial vehicles still faces various difficulties (Z. J. Zhu, 2015). As a new form of consumer credit, financial leasing has a substantial role in promoting new energy commercial vehicles (Xi, 2016), and consumers, vehicle manufacturers, and financial leasing companies can all benefit from it.

1. Solve the anxiety of new energy commercial vehicle ownership

As an emerging industry, new energy commercial vehicles are still in the early stages of development. Buyers and users of new energy commercial vehicles are generally concerned about problems such as vehicle battery degradation and cruising range, which has seriously

hindered the promotion and popularization of new energy commercial vehicles. As an innovative new financial tool, financial leasing can separate the "ownership" and "right to use" of the leased property, solving the anxiety and concerns on ownership and mileage. Purchasing a new energy commercial vehicle is actually buying the ownership of the vehicle. Financial leasing gives end consumers the right to use rather than the ownership of the new energy commercial vehicle. By financial leasing, end customers do not need to worry about the severe depreciation of new energy commercial vehicles due to battery degradation and cruising range, or even everyday use problems. End customers can choose to continue leasing, purchase with full payment, or return the vehicle based on their usage, which can solve the anxiety of ownership during the promotion and use of new energy commercial vehicles.

2. Relieve customers' financial pressure and purchasing concerns

Financial leasing can alleviate the financial pressure of customers when purchasing vehicles because they can have 100% right to use the new energy commercial vehicles by only paying a small amount of funds. For lessees in business operation, the leasing term of the financial leasing is longer, and the financing amount is more considerable, which has dramatically reduced the lessee's one-time investment in capital and fixed assets. Meanwhile, financial leasing can effectively increase the turnover and utilization rate of the capital, which enables the lessee to use funds for market development and operation, thereby reducing operational risks. In comparison, traditional financing methods such as bank loans have more complicated procedures, higher requirements, and lower financing. Adopting financial leasing can obtain better solutions in the above aspects and guarantee the funding, procurement, maintenance, and repair services of new energy commercial vehicles, which greatly simplify the related work procedures and risks in investment and operation.

In addition, the "value-preserved buyback + residual value leasing" model adopted by new energy commercial vehicle financial leasing can significantly reduce customers' worries about leasing or purchasing new energy commercial vehicles (Xi, 2016). As Dai Kun, Chairman, and CEO of Uxin Group, said in 2016, second-hand vehicles are the world's largest non-standard mobile market. When a car is reused, its core value (transportation value) is unchanged, so the residual value of second-hand cars is very high. The "value-preserved buyback + residual value leasing" model can preserve the value of end-customers cars, which can relieve customers' financial pressure and purchase concerns, lay the foundation for financial leasing companies' innovative leasing business models, and generate stability supply of second-hand cars and promote the development of the new energy second-hand car market.

3. Promote sales of new energy commercial vehicles

Financial leasing has relatively lower requirements on lessee's qualifications. For those who are short in funds and have difficulty in bank loans, financial leasing provides a convenient way for them to purchase new energy commercial vehicles, which can effectively promote the sales of new energy commercial vehicles. Financial leasing offers additional services for customers, such as vehicle registration, insurance, daily maintenance, battery replacement, emergency rescue. On the one hand, financial leasing forms a common development situation for upstream and downstream companies such as car companies, dealers, and service providers; and on the other hand, financial leasing can increase customer's stickiness to new energy commercial vehicles, increase vehicle replacement rate and promote sales. The collaborative development of upstream and downstream enterprises in the new energy commercial vehicle industry can not only break the traditional price war competition pattern, increase the income of the entire industry, enhance the ability to resist industry cycles, and improve overall service capabilities, but can also promote the sales of new energy commercial vehicles to a certain extent.

4. Accelerate the development of the new energy commercial vehicle industry

In September 2015, the General Office of the State Council issued the *Guidelines on Accelerating the Development of the Financial Leasing Industry*. The Guidelines suggest that developing new energy commercial vehicles and supporting facilities in buses, taxis, and official cars through financial leasing should be encouraged. Moreover, the *Guidelines* point out that, in order to expand domestic consumption, the leasing market for household consumer goods, including financial leasing of family cars, information equipment, consumer durables, should be actively and steadily developed. Under the guidance of the policy, buses, taxis, official vehicles, and special vehicles have become vital areas in the new energy commercial vehicle field. Vehicle financial leasing developed rapidly with the development of household' new energy commercial vehicles and increased public consumer acceptance. The expansion of the market has accelerated the development of the new energy commercial vehicle industry to a large extent.

In new energy commercial vehicle financial leasing, core infrastructure such as charging piles, charging stations, and batteries can also be leased as the subject matter. Financial leasing can help the development of charging infrastructure by solving the excessive one-time investment, releasing the capital, increasing the research, and accelerating the technological upgrading and market popularization, promoting the development of the new energy commercial vehicle industry.

2.4.2 New energy commercial vehicle financial leasing in China

China's new energy vehicle industry began in the early 21st century. At the beginning of its development, new energy commercial vehicles are promoted through government funding. Initially, the government funds were attributed to the public service field, such as buses, official vehicles, and special operation vehicles. In 2008, new energy commercial vehicles began to flourish in China, and 2008 is called "a new year of new energy commercial vehicles". In 2009, under the intensive supporting policy, China's new energy vehicle entered a rapid development. In 2010, China increased its supporting subsidies for new energy commercial vehicles and successively started subsidies for private purchase of new energy commercial vehicles in many cities. Since June, subsidies have been created in Shanghai, Shenzhen, Hangzhou, Changchun, and Hefei. In July, the number of pilot cities for demonstrating and promoting energy-saving and new energy commercial vehicles increased from 20 to 25, and the supporting subsidies for new energy commercial vehicles include financial appropriations, vehicle tax concessions, and new energy bus operation subsidies. Financial allocations are divided into state subsidies, local government subsidies, and special project support from the Ministry of Science and Technology. Most of the development plans of new energy commercial vehicles are led by the National Development and Reform Commission, the Economic and Information Commission, and the Science and Technology Bureau, which actively seek to develop public transportation through the financial leasing of new energy commercial vehicles.

In terms of prefecture-level cities, Shenzhen has adopted the strategy of "bus first, financial assistance" to popularize and promote new energy commercial vehicles. In 2012, the Latin America-China Shenzhen New Energy Bus Operation Forum was held in Shenzhen, and Shenzhen was expected to convert half of the public buses and large and medium-sized buses to electric vehicles within three years and convert all taxis to pure electric vehicles within five years. In Shenzhen's new energy vehicle strategy, Shenzhen-based car manufacturer BYD played an important role. BYD launched a "zero-dollar car purchase, zero-cost, and zero-emission" solution for the taxi and bus market. "Zero-dollar car purchase" includes three implementation modes: financial leasing, operating leasing, and buyer's credit. As the electricity price of new energy commercial vehicles is much lower than the petrol price of traditional vehicles, the monthly difference between petrol and electricity prices for operating new energy commercial vehicles can be higher than the monthly rent during the contract period.

Taking BYD e6 taxis as an example, the sales price after subsidies is about ¥180,000 in 2012. With zero down payment and a five-year full loan, the monthly payment for the car is

¥3576, and the monthly fuel-electricity difference for operating vehicles is ¥7166.

The saved fuel-electricity difference still has a surplus after paying off the monthly payment, significantly promoting new energy commercial vehicles. In addition, for the large-scale operation of new energy commercial vehicles, vehicle manufacturers and the State Grid take the responsibility of constructing the charging infrastructure, and financial leasing companies cooperate with partners to launch the maintenance of new energy commercial vehicles. In Shenzhen's commercial operation model of "financial leasing, double-locking and win-win, integration of replenishment and maintenance", stakeholders (such as manufacturers, investors, operators, customers) have achieved a mutually beneficial win-win situation, which has genuinely promoted the large-scale operation of new energy commercial vehicles.

In terms of new energy vehicle brands, thanks to the strong support of the country and the rapid development of the vehicle industry, new energy brands such as Tesla, Dense, NIO, BYD, Byton, SAIC Roewe, BAIC, GAC New Energy, Zotye are rising strongly. According to the *Report of China's New Energy Vehicle Industry Market and Strategic Investment Planning* released by the Forward Industry Research Institute, the production and sales of new energy commercial vehicles in China in 2018 were 1.270 million and 1.256 million, with the year-on-year increase being 59.9% and 61.7%, and the total number of charging facilities being 728,000. Significant progress has also been made in battery management systems, drive motors, and vehicle electronic control systems.

In terms of the financial leasing of new energy commercial vehicles, due to the fast development of the new energy commercial vehicle market and the rapid sales growth, the number of financial leasing companies involved in the industry is also increasing. Similar to other sectors, financial leasing is realized through sale and leaseback and direct leasing. For financial leasing companies engaged in new energy commercial vehicles, its broad market and strong industry development are accompanied by systemic risks (L. Zhou, 2017). First of all, the endurance of new energy commercial vehicles needs to be improved, battery technology is not mature enough, and supporting facilities are not perfect. These factors restrict the development and market promotion of new energy commercial vehicles, and indirectly affect its financial leasing industry. The business model and service capabilities of the leasing company put forward higher requirements. Moreover, the growth of new energy commercial vehicle production in the past few years is high-speed. Both the whole vehicle and the three-electric system have shown a state of "insufficient high-end products and overcapacity in low-end". Coupled with the strong dependence of new energy commercial vehicle sales on the subsidy policy, this will lead to the strong performance of the new energy commercial vehicle

market, and it will also be a huge market test for financial leasing companies. Anymore, the residual value of new energy commercial vehicles has not yet formed a mature evaluation system, and the evaluation of its residual value also lacks market standards. In addition, the second-hand market for new energy commercial vehicles has not yet reached a stable state, which has led to uniformed channels and means when dealing with second-hand new energy commercial vehicles. The lack of diversified channels and means has also increased the risks of financial leasing company operations.

2.4.3 Problems in new energy commercial vehicle financial leasing

With the introduction and implementation of relevant supporting policies, China's new energy commercial vehicle financial leasing has been developed to a certain extent; however, it is still in the early stage of development. As of end consumers, there are still many concerns about new energy commercial vehicle charging facilities, battery life, endurance mileage, costs of purchasing and using. These concerns will affect related companies engaged in new energy commercial vehicle financial leasing. Moreover, the financial leasing of new energy commercial vehicles still has problems in financing channels, leasing stability and residual value evaluation system, and risk control system.

2.4.3.1 Narrow financing channel and large funding gap

According to *Administrative Measures for Financial Leasing Companies* issued by the China Banking Regulatory Commission in 2014, when establishing a financial leasing company, the registered capital should be a one-time paid-in monetary capital, with the minimum limit being ¥100 million or equivalent convertible currency. In addition to the high threshold for the establishment of companies, financial leasing companies engaged in new energy commercial vehicles also need to invest a large amount of money to purchase vehicles. It is difficult for companies to rely only on their own funds to maintain normal operations, which means that financial leasing companies need to incorporate many external funds.

In countries with a relatively mature financial leasing system, the government usually allows financial leasing companies to finance through commercial banks, insurance companies, foreign investment, stocks, corporate bonds, short-term commercial paper, special funds. The financing methods of China's financial leasing companies mainly include endogenous financing, venture capital, listing financing, commercial bank loans, and private capital. According to the statistics, at present, more than 80% of the circulating funds of financial leasing companies in the industry come from bank loans, and most of them are short-term loans.

Except for bank-based financial leasing companies that have relative advantages in bank loans, most other financial leasing companies are hard to enjoy low-interest financing methods. For new energy commercial vehicle businesses, bank loans are greatly affected by policy factors. Due to the "insufficient high-end products and excess low-end production capacity" situation in the new energy commercial vehicle industry, the credit of bank loans is unstable. Therefore, companies that mainly rely on financial institutions such as banks can hardly meet the development needs of the new energy commercial vehicle financial leasing business. In China, the financing channels of most financial leasing companies are narrow, and the cost of capital use is high. If this problem is not solved, it will hinder the development of the new energy commercial vehicle industry and its financial leasing industry.

2.4.3.2 Poor stability of the leased property, lack a residual value evaluation system

Different from other leased properties such as large-scale industrial equipment, new energy commercial vehicles need to solve the daily maintenance of the vehicle and the battery and need to operate and maintain the charging facilities. Firstly, the vehicle's problems, such as the mismatch between the new energy commercial vehicle's battery life and the entire vehicle life and the fast degradation rate of the battery, will seriously affect the stability of the end consumer's use of the new energy commercial vehicle. Secondly, new energy commercial vehicles and their supporting facilities have year-on-year wear and depreciation. new energy commercial vehicle financial leasing companies not only need to invest much capital, manpower, and material resources in the equipment purchase stage but also need to consider the operation of supporting facilities. The poorer the operation status of the facility is, the higher the risks are.

Different from traditional cars, new energy commercial vehicles have serious problems such as battery degradation and endurance mileage. When an end consumer buys a car, he or she is actually kidnapped by the car, which seriously hinders the promotion of new energy commercial vehicles. The "value-preserving buyback + residual value leasing" model of financial leasing can solve the above problems to a certain extent. However, there is no mature second-hand new energy car market for now, and no mature residual value evaluation system has been formed yet. The accuracy of pricing second-hand car residual value usually depends on sufficient competition and abundant vehicle sources in the second-hand car market (Geng et al., 2015). In 2018, China sold nearly 30 million new cars, but the second-hand car transaction was only about 13 million. While in the US, the second-hand vehicle sales were 40 million units each year, and the peak of new car sales was only 15 million. It is an example of a marked

contrast (Y. Zhao, 2019). With the rising of the car number in China and faster car replacement, second-hand car trading market has ushered in the rapid development. However, problems such as the lack of legal protection, unsound system, information asymmetry, lack of market integrity have restricted the second-hand car market development (Hou, 2018). The immaturity of the second-hand car market in China has led to the imperfection of the residual value pricing mechanism of the second-hand vehicle, which led to the unscientific car rental pricing strategy and affected the development of the industry. In European and American countries where the second-hand car market is mature, more professional organizations provide car residual value analysis. These organizations can give corresponding databases and professional consulting analytics for car manufacturers and financial leasing organizations and then help customers establish residual value analysis models, pricing models, to reduce operational risks and improve profitability. Currently, few organizations can provide residual value data in China, not to mention the professional organizations that conduct residual value analysis.

2.4.3.3 Incomplete social credit system and risk control system

The financial leasing industry has specific requirements on customers' credit, but there lacks a complete social credit system. It is difficult to effectively control the risks of the new energy commercial vehicle financial leasing business. With the internal risk control system of some financial leasing companies being imperfect, the risk is even more prominent. According to the previous analysis, the risks faced by financial leasing companies mainly include direct financial risks and environmental risks. The capital recovery risk is the leading corporate financial risk, with the main influencing factor being the credit risk and management risk in the financial leasing business process, which is due to the imperfection of the credit system. Environmental risks are mainly caused by factors such as policies, exchange rates, industries, and markets and are closely related to the company's internal risk control management system.

In 2018, according to the *Notice on Adjusting the Management Responsibilities of Financial Leasing Companies, Commercial Factoring Companies, and Pawn Shops* issued by the General Office of the Ministry of Commerce - the financial leasing companies that were initially approved and supervised by the Ministry of Commerce - would have their supervision responsibilities assigned to the China Banking and Insurance Regulatory Commission, since April 20th, 2018. For most financial leasing companies supervised by the Ministry of Commerce, the *Notice* undoubtedly provides convenience for grasping customer credit information. However, some auto financial leasing companies have not yet connected to the central bank's credit information system in actual operations due to their external guarantees, mortgage

information, annual financial data, five-level asset classification, and overdue information. On the one hand, these financial leasing companies cannot fully understand the customer's debt situation during due diligence and business approval. On the other hand, as the lessee's default is not included in the credit investigation system, it may cause the customer to owe rent maliciously.

2.5 Chapter summary

First of all, this chapter introduces the concept of financial leasing and stakeholders. Based on the previous research on financial leasing risks, the risks of financial leasing companies are divided into two dimensions: financial risk and environmental risk. In terms of financial risks, the direct financial risks of financial leasing companies during the process of financial leasing business are mainly studied, including financing risks, capital recovery risks, and value fluctuation risks of the leased property. In terms of environmental risks, risks of policies, exchange rates, industries, and markets are discussed. While analyzing risks, the thesis also sorted out relevant literature on risk management and risk strategies.

For the evaluation method of financial leasing risks, the chapter presented the CAMELS model from the dimensions of capital adequacy, asset quality, management, earnings ability, liquidity risk, market risk, information technology risk, data governance, and institutional differentiation, which can conduct comprehensive risk evaluation and quantitative assessment from the dimensions of capital adequacy, asset quality, management, earnings ability, liquidity, and sensitivity to market. The chapter also described the index of the above dimensions.

Secondly, according to the research needs of the thesis, this chapter analyzed the literature on the pricing strategy of financial leasing. When pricing a financial leasing product, financial leasing companies should consider the time value and risk quantification of the lessors and pay attention to the lessee's unique needs and additional functions to determine the pricing strategy. The primary profit sources of financial leasing companies include interest income, residual value income, service income, operating income, and risk income. On this basis, the pricing of financial leasing products has the characteristics of comprehensiveness, differentiation, flexibility, and diversification. Meanwhile, the principles of normativeness, objectiveness, lower-cost limit and demand-oriented directions should be abided. When pricing a financial leasing product, the main factors to be considered are different from different angles, but the essence is to seek the optimal allocation of assets and the balance of risk and return. Research on pricing models abroad has mainly formed the pricing method systems, with capital asset

pricing model, three-factor model, discounted cash flow, and option pricing model as the representatives. The pricing model of financial leasing products in China mainly includes cost-plus pricing model, benchmark interest rate plus point model, customer profit analysis model, option pricing model, and RAROC model.

Furthermore, this chapter sorts out the relevant situation of China's new energy commercial vehicle financial leasing, including the concept, characteristics, business model, and advantages of new energy commercial vehicle financial leasing, and the analysis and existing problems of new energy commercial vehicle financial leasing. Regarding business models, China's new energy commercial vehicle financial leasing models include sale and leaseback, entrusted leasing, direct leasing, and "value-preserved buyback + residual value lease". new energy commercial vehicle financial leasing has three advantages: it can solve the ownership of new energy commercial vehicles; it can relieve customers' financial pressure and purchasing worries; it can promote sales growth of new energy commercial vehicles and accelerate the development of the new energy commercial vehicle industry. Meanwhile, new energy commercial vehicle financial leasing in China also faces some problems, such as narrow financing channels, significant funding gaps, poor stability of the leased property, lack of residual value evaluation system, and imperfect social credit system and risk control system.

Summarizing: when new energy commercial vehicle financial leasing companies conduct risk management, they can first perform a comprehensive risk assessment based on the CAMELS model, then analyze the financial and environmental risks based on the evaluation, and lastly integrate the management of the significant risks into the product pricing strategy to achieve a state where can control risks, develop the business, and achieve growth.

Chapter 3: Research Method and Research Design

3.1 Research method: a case study

A research method is an essential tool and a helpful way to carry out research (Bryman, 2012), and it is an overall plan for answering research questions (Robin & Rine, 2012). There are many research methods in management, such as comparative research method, historical research method, theory with practice research method, and case study method. Cheng (2001) pointed out that a case study is necessary to understand the world, an effective way to solve complex problems, and a supplementary solution to make decisions.

Sun et al. (2004) believed that case study methods, experimental methods, and questionnaire survey methods are the main research methods in social science. According to Yin (1994), the case study method is suitable for answering the “how” and “why” questions. However, case study method is controversial in applications because many people only regarded case study as an empirical method. If we look at a case study from a broader perspective, we will find that any research is based on individual cases. Theoretical research is the reflection and summary of individual cases, but people tend only to pay attention to the theory and ignore the background and process of the approach. Moreover, case studies are a good tool for spreading theory and specific practice for applying theory (G. Wang, 2016). The case study covers not only theoretical research and research logic but also specific research methods, such as quantitative and qualitative research. Therefore, a case study is a relatively comprehensive and full-scale research method (Yin, 1994).

According to Scapens (1990), Hussey et al. (1997), the case study method can be divided into an exploratory case study, descriptive case study, evaluative case study, and explanatory case study from different research tasks. The exploratory case study mainly focuses on finding new insights into things or examining cases with new perspectives. A descriptive case study primarily focuses on making an objective and accurate description of events. An evaluative case study is the researchers’ knowledge and opinions on the cases. The explanatory case study is meant for investigating and explaining issues such as causality and correlation (Eisenhardt, 1989). Case studies can also be divided into a single case study and multiple case studies (Meredith, 1998). A single case study can either support or oppose a theory or be presented as

an extreme case. Multiple case study usually includes two dimensions: intra-case analysis and cross-case analysis. Yin (1994) further divided case studies into comprehensive case studies and embedded case studies based on single case studies and multiple case studies.

In the practice of case study, a single case study can usually ensure the breadth and depth of the case study and better present the case's background and development (Dyer & Wilkins, 1991). Multiple case studies can better support the conclusions by using repeated cases to ensure the research validity (Eisenhardt, 1989). The choice of single or multiple cases is related to the nature of the research. If a single case study can support the research problem or the validity of the research construct, or if a single case is unique and extreme, then a single case study can be used for corresponding research (Sun et al., 2004). The thesis uses a single case study to research financial leasing companies' pricing strategy and risk management. The specific process of the case study is shown in the following Figure 3.1.

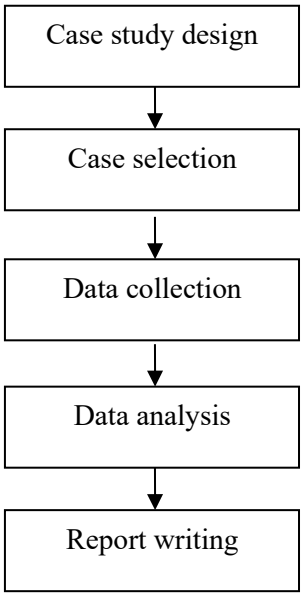

Figure 3.1 Process of case study

Regarding the standardization of case studies, M. Yan (2012) held that strict research procedures and scientific research methods should be adopted to avoid the randomness and subjectivity of research. Yan also proposed the case study steps, including case study design, data collection, data analysis, and report writing. Each step includes corresponding ideas and methods (J. Y. Mao & Zhang, 2008). Eisenhardt (1989) put forward the specific steps of a single case study, including problem definition (start-up), research design and case selection, research method and tool selection, data collection, data analysis, hypothesis formation, literature dialogue. Moreover, Strauss and Corbin (2014) proposed Grounded Theory, and Miles and Huberman (1984) proposed qualitative data analysis method to help researchers improve the scientific nature of case studies.

Regarding the evaluation of the case study, Yin (1994) believed that the case study could be evaluated with construct validity, external validity, internal validity, and reliability (H. T. Zhou et al., 2003). L. Lv (2011) argued that a case study is not a sample; instead, it is an individual and belongs to empirical research. The purpose of the case study is not only to verify the theory, so subjective evaluation can be adopted on cases from aspects such as typicality, enlightenment, trustworthiness, generalization, logical reliability, theoretical saturation, description accuracy, the importance of results.

Regarding the importance of theory to the case study, researchers such as Sun et al. (2004) and S. Liu (2018) consider that case studies need theoretical guidance just like other research methods. A case study is not a statistical generalization but an analytical generalization. The effectiveness of a case study often depends on the researcher's data analysis under the guidance of theory. When collecting and analyzing case materials, two competing theoretical hypotheses or models can be used, and the theory that is more supported by case materials represents the research findings. Therefore, theory is the specific guidance and the ultimate goal of case study.

3.2 Case selection

The case study involved in this thesis is a single-case study. There are usually five ways for carrying out a single-case study: the first is to verify, criticize, and expand a widely accepted theory; the second is to analyze extreme and unique cases; the third is to study typical and representative cases; the fourth is to investigate inspiring cases; the fifth is to study longitudinal cases. The thesis selects SQ company as the research case, which belongs to those mentioned earlier as second and fourth ways.

Established in Tianjin in April 2012, SQ company is a foreign-invested financial leasing company approved by the Ministry of Commerce. With the mission of "Born for Commercial Vehicles", SQ company is committed to combing technology with commercial vehicles, enhancing the value of commercial vehicles in multiple scenarios and throughout the cycle, and building China's leading intelligent service platform for commercial vehicles. After several years of exploration, SQ company has established a healthy ecosystem centered on commercial vehicles and around commercial vehicle drivers and owners, dealers, financial institutions, and logistics company shippers. At present, SQ company has grown to be the largest third-party commercial vehicle financial leasing company in China. SQ company has nearly 2,000 employees, and its business scope covers more than 700 county-level cities in 30 provincial administrative regions across the country.

Among the top 50 financial leasing companies issued by the Leasing Observation Network and the Data Center of Global Leasing Industry Competitiveness Forum, SQ company ranked 28th with ¥19.63 billion assets. Dagong International Credit Rating Co., Ltd. (from now on referred to as Dagong Appraisal Company) has a tracking rating of AA+ on the credit of SQ company. According to the rating report, SQ company's asset quality is good, and its reserve coverage rate is continuously at a high level. The "formal sale and leaseback" business model adopted according to the characteristics of the transportation industry has created favorable conditions for the stability and improvement of market competitiveness. Meanwhile, SQ company has introduced shareholders such as Bain Capital, Riverhead Capital Investment Management Co., Ltd. (from now on referred to as Riverhead Capital), Baidu (China) Co., Ltd. (from now on referred to as Baidu), China Leasing Merchants, CCB Trust. Besides enhancing the company's capital strength, new shareholders also bring other high-quality resources to the company. Baidu has brought various resources such as driving data, highway map data, financial credit data, artificial intelligence to SQ company, promoting SQ company to become China's most advanced smart logistics finance and service platform. CCB Trust and China Construction Bank have formed synergies with SQ company regarding capital and customers and launched in-depth cooperation in inclusive finance. China Merchants Leasing and its parent company China Merchants Group use their advantages in transportation and finance to further support SQ company's development of inclusive finance and accelerate its development in the logistics sector. The resources and advantages of SQ company are incomparable in the financial leasing industry, which makes the case unique.

Founded in 2012, SQ company is a young company in rapid expansion. At present, the main business of SQ company is financial leasing. Although the company's business structure is simple, its business channels are rich, including heavy-duty commercial vehicles, logistics services, second-hand vehicle transactions, new energy commercial vehicles, after-car finance. The macro policy environment, industry environment, and development issues faced by SQ company are the same of other companies engaged in the new energy commercial vehicle financial leasing business. The financial risks, environmental risks and pricing issues, risk management, risk-based pricing strategies, faced by SQ company in the new energy commercial vehicle financial leasing business, have a particular reference to peer companies, bringing inspiration and originality to this case study.

3.3 Research design

Research design is the overall planning of the research work and the general arrangement that combines research questions with case materials. Research design mainly includes establishing research topics, choosing research paths, clarifying research methods and operating procedures. Research design has a critical role in research practice because it provides a research blueprint, focuses on the research questions, clarifies the research boundary, and predicts the possible problems.

3.3.1 Data collection

The case study process covers various methods, including research logic, data collection, data analysis. A case study is a systematic process from data collection and analysis to developing and verifying theories (J. Y. Wang, 2013). Regarding the data collection for the case study, commonly used data sources usually include documents, archive records, interviews, physical objects, direct observations, and participating observations. According to Yin (1994), we should pay attention to the following three points in the data collection process: firstly, multiple sources of evidence should be used, including various data sources, multiple collection methods, multiple theoretical perspectives. Various sources of evidence can improve the objectiveness and accuracy of the research. Secondly, the recording and sorting of data should be paid attention to, and the case database should be established, including original data and related documents, interviews, observations and analysis, data. Thirdly, the case data is used to establish an evidence chain and, the research question, research content, and research conclusion should be linked to study the research problem and finally draw conclusions (Sun et al., 2004).

Following the principles of multiple data sources, multiple collection methods, and multi-disciplinary perspectives, the case study in this thesis is based on primary data collection and secondary data collection. The data collection channels include company websites, company news, company documents, relevant forums, company bond prospectus, third-party agency’s rating reports, company products, interviews. After data collection, the data is classified, analyzed, and coded to form our case study's “theoretical guidance + case analysis + theory development” research logic.

3.3.1.1 Primary data collection

Among the above-mentioned data collection channels, interviews and trials of company

products belong to primary data collection.

The interview collects first-hand information through conversations between the researcher and the related parties, which is purposeful (W. Yang, 2001). According to the structure, interviews can be divided into open, semi-open, and closed-ended interviews. Open interviews usually do not have a fixed interview outline, and the interviewees can express their ideas on specific questions. Semi-open interviews mainly require the researcher to control the interview process and the interviewee to participate actively. Closed-ended interviews usually standardize the interviewees, questions, standards, procedures, and the researcher controls the entire interview.

This research adopts semi-open informal interviews to collect data about the financial risks, environmental risks, and corresponding pricing strategies of SQ company's financial leasing business. The interview lasted for 3 months from Aug. 2020 to Oct. 2020, and each interview lasted 30-60 minutes. We interviewed 1 vice manager, 4 persons in charge of SQ company's risk management department, new energy commercial vehicle department, internet center, and post-loan management center, 12 middle-level employees and 20 front-tier employees. The interview protocol is presented in the appendix.

Experiencing the company's products and management process of financial leasing is also a way to collect the primary information. As for the financial leasing business, SQ company launched its business management system in 2012, which can realize the full-process management of financial leasing, including the financial leasing of new energy commercial vehicles. The company's business management system includes a risk control management platform and an account fund management module. The risk control management platform can be divided into business channel, business product, and business management. The business channel includes website client, mobile apps, and internal corporate governance. The business product includes direct leasing, sale, and leaseback, manufacturer leasing. Business management includes customer management, credit management, work task management, project management, contract information management, leasing management, fund placement management, fund repayment management. The account fund management can perform account management, accounting processing, interest rate/premium rate configuration, account reconciliation management, expense management. The business management system of SQ company can connect to interface modules such as banks, commercial insurance companies, insurance agencies, credit reporting agencies, enterprise ERP, and enterprise financial systems. The business management system of SQ company can realize complete automatic online management.

3.3.1.2 Secondary data collection

Secondary data refers to the relevant or irrelevant data that existed before the research and was collected by others for different purposes (Z. C. Liu & Zhang, 2011). Secondary data is relatively objective and authoritative because they come from others. Secondary data is a commonly used data collection method in management research. For the case study, secondary information is divided into internal sources and external sources. Internal sources are internal company information, such as company website, accounting books, sales statistics, management regulations, rules and regulations, business information, customer information. External sources are the audit evaluations of the company by external third parties, such as relevant forums, industry associations, relevant investigation agencies, mass media.

Compared with primary data, secondary data is rapid, convenient, and cheap, which can help researchers obtain a large amount of background information, clarify research topics, find potential problems, and make the investigation more convincing. However, secondary data also has disadvantages such as low relevance, accuracy, and insufficient information, which requires researchers to pay attention to the data source when collecting secondary data. Generally, the data issued by government departments, industry associations, and professional investigation agencies have high credibility, such as listed company data, patent data, professional rating data, asset securitization ABS data. We should also pay attention to the timeliness and relevance of the data and research topics to evaluate the quality of the secondary data. The secondary data collected in case studies are used as a background investigation method, a data collection method, an essential data source and application form, and a supplementary data investigation.

This thesis takes secondary data as the main data collection method, as well as the essential data source and application form. The data come from company websites, relevant statistical departments, industry associations, and third-party professional survey institutions. It is worth noting that the financial data of SQ company is the crucial information of this case study. These datasets are derived from the tracking rating report of SQ company by Dagong International Credit Rating Co., Ltd. in June 2019, the corporate bond prospectus issued by SQ company in 2017-2019, and the annual report and annual financial statement of corporate bonds.

3.3.2 Data processing and data analysis

For the collected data of the case study, further coding, classification, analysis, and selection are required. This process is throughout the writing of the case analysis report, and the research

design will also be modified and optimized by relevant data and arguments. The data processing is carried out under the guidance of the general analysis strategy. This thesis adoted the type matching and time series method (Sun et al., 2004). In this study, we firstly establish an empirical or experimental data logic from the analysis of case data; then, we compare the theoretical model with the case logic to support or oppose the theoretical model. Adopting the time series is the tracking of related events in a specific period of time to describe the cause, course, and result of the event.

Among the analysis methods of case data, content analysis is the most common method (Dong, 2016). According to Bernard (1947), content analysis is a research technique that can describe the content objectively, systematically, quantitatively, and qualitatively. For case analysis, content analysis usually has three manifestations: firstly, define the characteristics and tendencies of the case objectively; secondly, describe and predict the development trend of the case and discover its changes; thirdly, compare the features of two or more cases and analyze their styles and characteristics. The content analysis method has a wide range of applications in research, such as for situations where there are only documents and data acquisition is complex, or as an aid and supplement to data analysis. When it is difficult to make a comprehensive and systematic evaluation of cases only with data, content analysis is particularly important (S. H. Jia & Dou, 2010).

Qualitative analysis and quantitative analysis are two major scientific research methods. Management is a complex, comprehensive, and multidisciplinary research object, so appropriate research methods should be selected according to the needs of the research topic. Based on the needs of the case study and under the guidance of the type matching analysis strategy, the thesis adopted the content analysis method to analyze the risk situation and pricing strategy of SQ company. Meanwhile, qualitative analysis and quantitative analysis are combined according to the characteristics of the research data. For example, for evaluating the risk situation in the CAMELS model, the thesis adopted the quantitative analysis method to comprehensively assess the research case’s risk situation.

3.4 Chapter summary

First of all, in this chapter, we analyzed the concept, classification, standardization, evaluation, and theoretical guidance characteristics of the case study. Then, this chapter introduced the case selection, including single case study design, basic information of SQ company, and the uniqueness and inspiration of selecting SQ company as the case. Furthermore, this chapter

sorted out the data collection principles and the data sources and explained the channels and content of primary and secondary data collection in the thesis. Lastly, this chapter introduced data processing and analysis methods such as content analysis method. Figure 3.2 presents the steps of data processing.

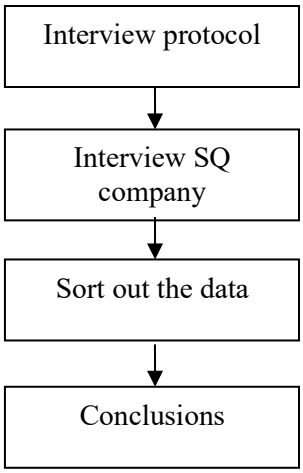

Figure 3.2 Data processing

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Chapter 4: SQ Company and Its Business

This thesis takes SQ company as the case to study the pricing strategy and risk management of new energy commercial vehicles. This chapter organized the materials obtained through the interview and analyzed the basic status and business of SQ company.

4.1 Basic information of the company

SQ company was founded by Wan Jun in 2012. As the chairman and CEO of the company, Wan Jun believes that concentration produces power. Only when the company concentrates on certain industries can it accumulate customers. In that way, the company could better understand the industry ecology and control industry risks more precisely. Therefore, SQ company focuses on commercial vehicles, and helps customers develop new operating and business value-added models. Based on providing financing services, SQ company provides its customers with value-added business services. Since 2017, SQ company has gradually withdrawn its business from the non-commercial vehicle field and began to focus on commercial vehicle leasing and logistics transportation. After selling its subsidiary SQ Logistics in 2018, the company shrank strategically and focused on the financial leasing business of commercial vehicles. SQ company has become the largest independent third-party financial leasing company in the commercial vehicle field and has a leading position in the area. Besides the idea of concentration, Wan also pays great attention to risks. In Wan's opinion, financial risk is the first thing the company should consider. No matter how advanced the company's technology is and how efficient big data is, people are always conducting financial leasing transactions. Production and operation have the nature of organizational and financial risks, and the macro environment and policies of the industry will also bring certain environmental risks.

The development of the financial leasing industry is inseparable from the focus and support of capital (Z. J. Mao, 2013). SQ company has attracted a large amount of capital during its development. SQ Capital, the controlling shareholder of SQ company, is a company established in Hong Kong in 2011. SQ company is the main component of SQ Capital. From 2015 to 2017, SQ Capital contributed $70 million to the company to supplement the capital. In September 2014, SQ Capital introduced Bain Capital, a U.S. private equity fund, as its controlling shareholder. In June 2018, Baidu and Riverhead Capital Investment Management Co., Ltd.

invested ¥1 billion in SQ Capital. In January 2019, SQ company received an equity investment from a new shareholder, China Merchants Commercial Financial Leasing Co., Ltd. In August 2019, SQ company once again attracted a new shareholder, CCB Trust Co., Ltd., a subsidiary company of China Construction Bank. Meanwhile, SQ Capital contributed $78.08 million and $33.75 million to the company in June 2018 and February 2019. Moreover, SQ company has a good credit, which wins it high credit limit from Shanghai Pudong Development Bank, Minsheng Bank, Ping An Bank, Industrial Bank, Hua Xia Bank, Huaxin Trust, China Construction Investment Trust, Industrial Trust, AVIC Leasing. By the end of September 2019, the company's total bank credits have exceeded ¥3.7 billion, and the unused credits were approximately ¥2.6 billion.

In the development of SQ company, the company has accumulated strong market promotion capability, risk control, management capability, market replication capability, asset clearing, and disposal capability. With retail finance as the core of its business model, the company has established cooperative relationships with more than 8,000 dealers in more than 700 cities across the country. The company has not only grown rapidly but also won the recognition of partners, customers, and peers for its high-quality services. SQ company has also obtained many honors. For example, SQ company is the first chairman of the China Financial Leasing Forum•Auto Finance Professional Committee and the vice-chairman of the Leasing Industry Committee of the China Foreign Investment Enterprises Association. SQ company was awarded by the Fifth Global Leasing Industry Competitiveness Forum as the Best Auto Finance Innovative Enterprise, China Financial Leasing Company of the Year 2018, 2016 China Financial Leasing List Enterprise, the 2016 Annual Company Award.

At present, the three primary businesses of SQ company are new operations, microfinance, and large transport capacity.

New operation means that SQ company upholds the concept of connection and symbiosis and uses technical and financial tools to empower partners to develop new operating models and obtain excellent value. New operation mainly includes technology empowerment of car dealers, worry-free solutions for new energy logistics vehicles, quick transactions of second-hand trucks, and industry empowerment of second-hand trucks. Regarding the technology empowerment of car dealers, SQ company uses SaaS (Software as a Service) to provide large customers such as dealers and vehicle transportation companies with comprehensive solutions such as business management, customer diversion, inventory financing, and operation financing. SaaS is a platform to operate the SaaS software. SaaS can provide companies with a series of services required to realize informatization, such as basic internet facility, hardware operation

plateform, installation of informatization and maintenance. With the help of SaaS, companies can share the information system without buying hardware, building machine room and recruiting IT staff. Regarding the worry-free solution for new energy logistics vehicles, on the one hand, SQ company has in-depth cooperation with China FAW as the first-level agent of FAW Jiefang new energy commercial vehicles in many regions across the country; on the other hand, SQ company provides end-customers with comprehensive worry-free solutions for new car purchase (operating leasing, purchasing by renting), vehicle maintenance, charging rescue, and emergency backup vehicles. Quick transactions of second-hand trucks mean that SQ company provides online display and offline view for both parties in the second-hand car transaction, supplemented by tools such as auction platforms, inventory financing, transaction guarantees to ensure fast and safe transactions. Industry empowerment of second-hand trucks means that SQ company has an industry-leading commercial vehicle model library and fully supports the trading activities of second-hand vehicles through online and offline evaluation and testing.

As for micro-finance, SQ company established a retail financial network that can provide financial services to customers such as car owners and dealers as an independent third-party commercial vehicle finance company. In the past six years, SQ company has supported nearly 140,000 commercial vehicle drivers and individual car owners through financing and services and has become a model in the industry for supporting the real economy and practicing inclusive finance. What's more, the online and offline financial services provided by SQ company can penetrate different scenarios in the complete life cycle of commercial vehicles. During the new car purchasing, SQ company can provide various financing solutions to solve the financial needs of customers in car purchasing. During the vehicle operation, SQ company can give financial support to customers in terms of vehicle insurance, fuel, postage, vehicle maintenance. During the follow-up period, SQ company also provides funds for customers to update and upgrade vehicles, buy and sell second-hand cars.

Large transport capacity is the transport outsourcing services provided by SQ company to the demanders of transportation such as express and LTL lines. Based on massive operating data, SQ company has established a data warehouse and corresponding models to provide big data support for more intelligent transportation. As a result, the company's order management and vehicle matching efficiency have been greatly improved. Meanwhile, SQ company has a smart pricing system, which can realize intelligent pricing based on the supply and demand relationship in the transport capacity market to guide the pricing of upstream and downstream transactions. Moreover, after several years of business development, SQ company has

determined a “heavy + light” business development model with equal emphasis on asset operation and platform strategy. SQ company provided comprehensive solutions for customers’ capacity needs: car-owned carriers can solve customers’ stable capacity needs, and car-free carriers can solve the volatile requirements of customers.

4.2 Financial leasing of new energy commercial vehicles

4.2.1 New energy commercial vehicle business

New energy commercial vehicle is an important business of SQ company. Following the “product + finance + after-sales” service model, SQ company provides users, drivers, and car owners with full-cycle and multi-scenario solutions as well as one-stop service. As for the new energy commercial vehicle business, the positioning of SQ company is integrating high-quality resources in the new energy urban logistics vehicle industry and offering comprehensive services such as vehicle leasing purchase, financial support, license, maintenance, and charging rescue according to customer’s operational needs. SQ company is committed to providing customers with cost-effective new energy urban logistics vehicle service products and developing into China’s leading service brand in the field of new energy commercial vehicles. The vehicles provided by SQ company are mainly new energy urban logistics vehicles sold by mainstream domestic manufacturers, including 4.2-meter light trucks, microvan, SUV, and refrigerated vehicles. Currently, the company has more than 50 dealers and has in-depth cooperation with automobile brand manufacturers such as FAW Jiefang, Chery, Dongfeng, BAIC, Changan. The company’s business covers cities like Beijing, Shanghai, Guangzhou, Shenzhen, Tianjin, Chengdu, Haikou, Wuhu. The service groups of the company are mainly urban logistics companies, express companies, individual drivers of urban logistics, and vehicle leasing companies. The company has established a mature offline service team to provide customers with guaranteed car purchase services and after-sales service. In the financial leasing of new energy commercial vehicles, SQ company will adopt different leasing models according to the characteristics of the industry, including direct leasing, sale and leaseback, and leveraged leasing. Among them, direct leasing, as well as sale and leaseback, are mostly adopted.

In the management process of the leasing business, in addition to the self-built business management system, SQ company has also established a business management system and strategy before, during, and after leasing. SQ company has achieved intelligent management through its financial leasing business management system, and the management process is

shown in Figure 4.1.

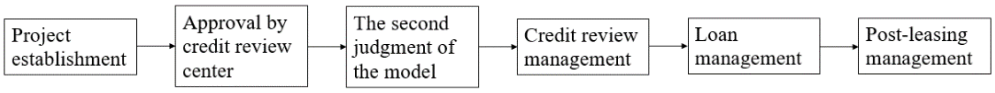

Figure 4.1 The business management process of SQ company

Project establishment: The dealer enters the customer information on the mobile phone, and the system evaluates the customer's credit based on the risk control model. If the customer's risk factor is high, the system will automatically reject the order. If the customer's risk factor meets the standard, the customer information will be automatically pushed to the account manager. The account manager determines the financing plan according to the customer's leased property and capital needs, completes the customer's credit survey, issues survey opinions, uploads all the information to the APP, and completes the project establishment.

Approval by credit review center: According to the rating of the risk control model and the feedback from the customer manager, the company's credit review center re-judges and confirms the information of the lessee, lessee's spouse, and guarantor through phone calls. Meanwhile, the credit review center verifies the value of the leased property based on market conditions and vehicle information.

The second judgment of the model: The customer's risks are rated for a second time by the company's risk control model, which is based on more comprehensive and detailed customer information. If the customer doesn't pass the judgement, it will prompt supplementary information for further review or directly reject the order. If the customer passes the judgement, the approval will go through into the next process.

Credit review management: SQ company determines the risk review process according to the specific conditions of the project, which is then reviewed and analyzed independently by the call center, business department analysts, and credit review department analysts. Large-amount financial leasing business must first undergo independent on-site review by analysts from the business department or credit evaluation department and then be collectively reviewed and approved by the business department evaluation committee or the company risk evaluation committee. Among them, the risk evaluation committee comprises the company's CEO, the vice president in charge of risk control, the general manager of the credit review department, the general manager of the project-related business department, and the legal director of the risk management department.

Loan management: After the review and approval of the project, the account manager will initiate the loan process and submit the required materials of the corresponding contract

documents. Then, the call center, the business assistant of the marketing strategy department, the business assistant of the local company, the financing department, and the capital department will conduct a review in turn, after which the loan will be started. The information of each project is finally archived and managed by the warrant center.

Post-leasing management: During the leasing period, for lessees who usually repay the loan, the company call center will collect the rent in advance by SMS reminders and outbound calls according to the agreement of the financial leasing contract. For overdue lessees, the company will use litigation or non-litigation methods to retrieve the leased property and clear the accounts receivable according to the specific overdue situation. For the recovered leased property, the company mainly conducts liquidation processing through the second-hand market.

4.2.2 Risk management system

The business of SQ company is concentrated in North China, Central China, and South China, which is relatively scattered. SQ company's financial leasing business customers are widely distributed in different industries, which is also scattered. The decentralization of customer groups and business regions can help SQ company effectively avoid a concentration of credit risks to a certain extent to ensure that the company will not face significant risks of bad debts.

Paying great attention to the management of the business risks, SQ company has established a risk control system, accounts receivable management system, and overdue management system, as shown in Figure 4.2.

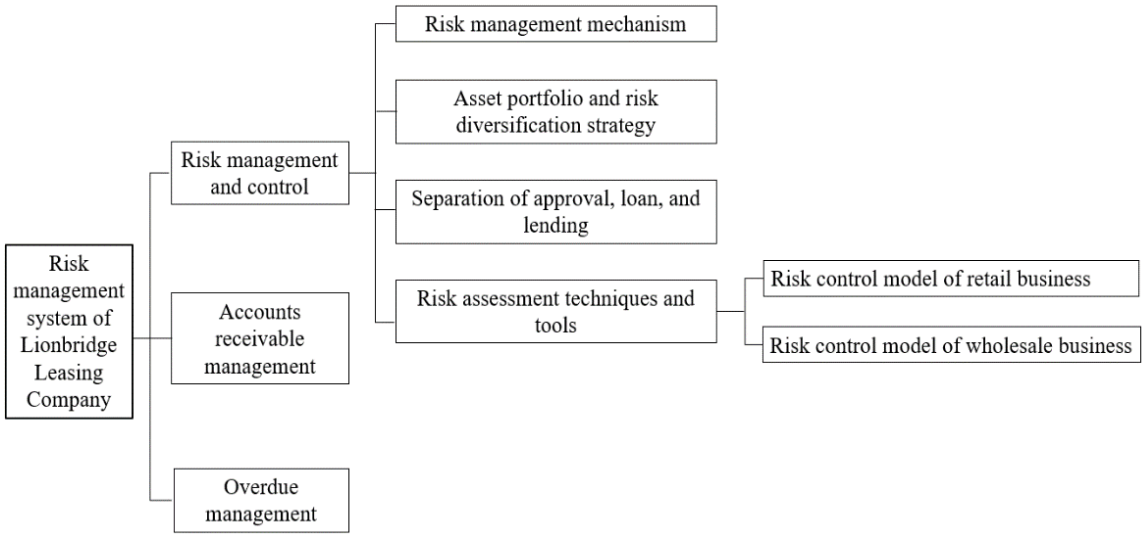

Figure 4.2 The risk management system of SQ company

Risk management and control mainly include four parts: risk management mechanism, asset portfolio, and risk diversification strategy, separation of approval, loan, and lending, risk

assessment techniques and tools. Firstly, the risk management mechanism of SQ company has been further improved after Bain Capital became the actual controlling shareholder in 2014. The business plan of the company's business lines and the risk-return plan of financial leasing products need to be studied by the board of directors to prevent potential risks brought by the company's business model from the top-level design. Secondly, the company strictly controls the investment ratio of financial leasing assets in each business. SQ company currently invests its financial leasing assets in heavy road freight trucks that are less affected by the macroeconomic cycle and adopts a retail strategy to diversify risks. Thirdly, the company strictly implements the principle of separating approval, loan, and lending. After the investigation of the project manager, the leasing project will be reviewed by the risk control department. The corresponding risk review process will be determined according to the category and quota of the lease project, and then, the leasing project will be reported to the relevant department for approval. The lending department will prepare the appropriate documents, and once the lending conditions are met, the loans will be initiated. Fourthly, based on the knowledge and experience of the professional teams in various sub-industries, the company has established risk assessment techniques and tools for individual financial leasing projects.

As a crucial current asset of the company, accounts receivables have a significant impact on the company's economic benefits. Accounts receivable will increase the company's burden of recovery and affect the company's liquidity and make the company's estimated profit inaccurate. In the course of its business operations, SQ company always pays attention to accounts receivable management. Based on customer credit management, the company mainly deals with accounts receivables through ledger establishment, business entry system, deduction, and decomposition to reduce the company's accounts receivable risk.

Overdue has a substantial negative impact on the financial leasing company. In general, 90-day overdue can be regarded as a criterion for a bad asset. The longer the asset is overdue, the lower the possibility of recovery is, and it may even become the company's bad debt. SQ company has established a corresponding overdue recovery system and strict enforcement measures. Once the leasing project is launched, SQ company will assess the risks of the project monthly or quarterly, and the assessment includes the repayment ability of the customer (lessee), the usage and value changes of the leased property, and the risk of rent recovery. These measures can continuously track and evaluate the risk of the project.

In addition to the internal risk management system, the company was approved to access the corporate and personal credit reporting system of People's Bank of China in July 2016,

which allows SQ company to have a more comprehensive understanding of customers' credit and dramatically increases the company's ability to control risks. In 2017, the company upgraded the original IT technology system, which significantly improved the approval and processing speed of the company's commercial vehicle business. Based on the data accumulated in the past and combined with massive external third-party data, SQ company has established a data-based risk control model. The model optimizes the approval process and methods and enables more stringent and accurate management of leased properties, which greatly improves the company's risk control capabilities and the quality of new assets in the commercial vehicle business. Meanwhile, SQ company has established a strong network, team, and process system in the commercial vehicle market, enabling the company to occupy a considerable advantage in the industry regarding speed, efficiency, experience, breadth and depth of business distribution, and synergy.

4.2.3 Company revenue and product pricing

With the company's strategic focus on commercial vehicles, the financial leasing of commercial vehicles has become the central revenue for SQ company. Meanwhile, the company's other business revenue has also improved, forming an effective supplement to the primary business revenue. According to the annual bond report of SQ company, in 2018, the company achieved an operating income of ¥1.710 billion, with the year-on-year increase being 11.11%. Among the operating revenue, the financial leasing revenue was ¥1.6 billion, with the year-on-year increase being 5.54%, accounting for 93.57% of the company's operating income.

In 2019, the financial leasing revenue of SQ company was ¥1.996 billion, accounting for 82.67% of the total operating income. In addition to the central business revenue, SQ company also has revenue from loan-facilitated service and other business, mainly including management and service fee revenue, automobile sales revenue, operating leasing revenue. The company's specific operating income is shown in Table 4.1.

Table 4.1 SQ company's operating revenue and financial leasing business revenue

Business	2019				2018			
	Revenue (¥100 million)	Cost (¥100 million)	Gross profit rate (%)	Proportion of revenue (%)	Revenue (¥100 million)	Cost (¥100 million)	Gross profit rate (%)	Proportion of revenue (%)
Financial leasing business revenue	19.96	9.25	53.68	82.67	16.00	9.04	43.49	93.57
Loans promotion	2.82	1.38	50.97	11.68	3.79	1.93	49.09	2.22

business revenue								
Other business revenue	1.37	0.57	58.52	5.66	0.72	0.19	74.16	4.21
In total	24.15	11.20	53.64	-	17.10	9.42	44.91	-

In the transportation industry, vehicles need to settle under the name of a relevant transportation company to obtain the operating qualification issued by the transportation department. Therefore, the lessee in the transportation industry mainly adopts the leaseback model, that is, the lessee first purchases the vehicle and settles the vehicle to the lessee or the designated affiliated company and then signs a sale and leaseback contract with SQ company. In actual operation, the leaseback model is divided into a standard sale and leaseback model and a formal sale and leaseback model. In the standard sale and leaseback model, the owner of the target property (the lessee) sells the target property to the lessor, obtains the transfer consideration paid by the lessor, leases the target property back for use, and collects rent regularly at the agreed rental interest rate. In the formal sale and leaseback model, the target property owner (the lessee) sells the target property to the leasing company and legally recognizes it as a form of sale and leaseback. However, in the transaction process, the lessee, the supplier, and the leasing company will make the following agreement: the lessee purchases the subject matter from the supplier; the leasing company pays the supplier at the consideration of the subject matter; the lessee obtains the leased item and delivers to the leasing company at the agreed price. Formal sale and leaseback are the same as direct leasing in terms of cash flow. In 2018, SQ company invested a total of ¥11.413 billion in financial leasing, with the project number being 56,903. These projects mainly adopt the form of sale and leaseback, and the term of the financial lease contract was usually 1-3 years. The specific business of SQ company is shown in Table 4.2.

Table 4.2 Financial Leasing Business of SQ company

Project		Investment amount (¥100 million)	Number of projects
Financial leasing business model	Direct leasing	0.18	83
	Sale and leaseback	113.95	56820
	Standard sale and leaseback	2.42	1946
	Form sale and leaseback	111.40	54747
Financial leasing contract period	Within 1 year (including 1 year)	4.64	3501
	1-3 years (including 3 years)	109.44	53380
	3-5 years (including 5 years)	0.05	22
	More than 5 years	-	-

In terms of product pricing, SQ company adopts market-oriented and professional pricing methods based on the characteristics of different products, and its pricing methods and pricing mechanisms have been well developed. Regarding the pricing of new energy commercial

vehicle financial leasing, SQ company mainly adopts the cost-plus pricing model. Meanwhile, SQ company also comprehensively considers its risk factors and the specific circumstances of the lessee, such as the lessee's operating conditions, cash flow targets, and cost. In the practice of product pricing, the company adheres to the concept of "not all risks will affect asset prices" in the capital asset pricing model and mainly considers risk factors such as trust risk and leasehold value fluctuations in the process of financial leasing.

When pricing the new energy commercial vehicle financial leasing, SQ company considers the capital cost and management cost of the transaction and also the risks inherent in the transaction; that is, the appropriate risk premium is part of the product price. The company's pricing principle is:

$$HR=CF+MC+RP+TY$$

Where HR is the price of the leased product, CF is the cost of fund, MC is the management cost, RP is the risk premium, and TY is the target yield. SQ company's funds mainly come from publicly issued bonds and loans. The interest rate of the financial leasing business bases on the benchmark lending rate of the People's Bank of China and rises by a certain percentage. When calculating the CF of the leasing business, various leasing rates are used according to different contractual term factors, and the benchmark loan interest rate of the same term and the cost of excess capital are referred.

4.3 Chapter summary

This chapter introduced the basic information of SQ company and its financial leasing business in new energy commercial vehicles. Firstly, this chapter illustrated SQ company's focus on business and emphasis on risk management. Meanwhile, SQ company's capital support, technical support, business content, and logic are clarified. Secondly, this chapter sorted out the company's new energy commercial vehicle business, business management process, and risk management system. Finally, this chapter listed the company's business income, financial leasing projects, and pricing principles in the financial leasing business.

Chapter 5: Field Research: The Risk of SQ Company

Like other companies in the industry, the risks faced by SQ company mainly include financial risks and environmental risks. The chapter first uses the CAMELS model to assess the risks of SQ company and then analyzes the specific risks in detail.

5.1 CAMELS evaluation analysis

SQ company has developed rapidly in recent years. In 2017, the company achieved an operating income of ¥1.539 billion and a total profit of ¥207 million. In 2018, the company reached an operating income of ¥1.710 billion and a total profit of ¥275 million. In 2019, the company realized an operating income of ¥2.415 billion and a total profit of ¥309 million. According to the financial statements and audit reports of SQ company in 2019, the relevant financial indicators are shown in Table 5.1.

Table 5.1 Financial data of SQ company in 2019

Number	Project	Ending balance (ten thousand yuan)
1	Total assets	2,220,828.82
2	Total liabilities	1,897,378.91
3	Net assets	323,449.91
4	Current liabilities	1,426,837.05
5	Current assets	1,396,559.01
6	Non-current liabilities	470,541.86
7	Non-current assets	824,269.81
8	Operating income	241,512.32
9	Operating costs	111,974.32
10	Total profit	30,948.45
11	Net profit	22,863.31
12	Owners' equity	323,449.91
13	Risk assets	1,569,844.42

5.1.1 Capital adequacy

Based on the financial data of SQ company in 2019, the capital adequacy can be calculated according to the formula:

Capital = Net capital ÷ Risk assets × 100%

=323,449.91÷1,569,844.42×100%

=20.60%

The capital of SQ company is 20.60%, higher than the limit of level 1, which is 10%.

Therefore, the company's capital is relatively sufficient, the ability to deal with risks is strong, and the company can deal with the losses caused by risks.

5.1.2 Asset quality

In terms of assets, SQ company regularly monitors whether the receivables of financial leasing projects are overdue, and the receivables overdue for more than three months are regarded as non-performing leased assets. According to the tracking report on SQ company carried out by Dagong Appraisal Company in 2019, the company's non-performing leased asset ratio in 2018 was 0.94%, and the provision covering the non-performing lease asset ratio was 198.17%. The non-performing leased asset ratio in 2019 was 0.92%, and the provision covering non-performing lease asset ratio was 198.17%, which is the same with 2018. The asset was at level 1, indicating that the company has good asset quality, adequate provision, a solid ability to manage credit risks, and lower operating risks.

5.1.3 Management

SQ company has a sound corporate governance structure and has accumulated rich management experience during the development. In the company's organizational structure, there are business divisions such as the new energy commercial vehicle division and passenger car division. Besides, there are also supporting departments such as capital center, internet center, operation center, credit review department, risk management department, inspection department, and finance department.

Each department has a clear division of work and operates independently so that each business could perform smoothly. In the *Administrative Measures for Financial Leasing Companies* promulgated by the China Banking Regulatory Commission in 2017, the regulatory indicators for the management of financial leasing companies are stipulated. According to the rating reports and financial statements of SQ company in 2019, the relevant indicators are summarized in Table 5.2. The above table shows that all of the indicator values of SQ company are within a reasonable range and all meet the regulatory requirements.

Table 5.2 Management of SQ company

Indicator	Calculation	Reference value	Value of SQ company
Capital adequacy	Net capital/risk-weighted assets	≧8%	24.87%
Single customer financing concentration	Single tenant financing balance/net capital	≦30%	0.20%
Top 10 client financing concentration	Top 10 client financing balance/net capital	≦50%	1.55%

Single customer relevance	Single related party financing balance/net capital	≦30%	0.86%
Single shareholder relevance	Financing balance of a single shareholder and all related parties / shareholder capital contribution	≦100%	100%
Interbank lending ratio	Interbank borrowing funds/net capital	≦100%	37.47%

5.1.4 Earnings ability

Earnings ability can be calculated using the financial data of SQ company in 2019, that is:

Return on assets = total profit ÷ total assets × 100%

=30,948.45÷2,220,828.82×100%

=1.39%

Return on capital = total profit ÷ total capital × 100%

= Total profit ÷ owner's equity × 100%

=30,948.45÷323,449.91×100%

=9.57%

In the past three years, the total profit of SQ company has been increasing. In 2019, the return on assets was 1.39%, which is higher than the limit of level 1 (l%), and the return on capital was 9.57%, which is slightly lower than the limit of level 1 (l0%). The profit of the company indicates that the company's overall Earnings ability is strong.

5.1.5 Liquidity

Based on the financial data of SQ company in 2019, the liquidity ~~of liquidity~~ can be calculated as follows:

Current ratio = current asset ÷ current liability × 100%

=1,396,559.01÷1,426,837.05×100%

=97.88%

Current debt ratio = current debt ÷ total debt × 100%

=1,426,837.05÷1,897,378.91×100%

=75.20%

In 2019, the current ratio of SQ company was 97.88%, and the current debt ratio was 75.20%. Among them, the company's current ratio is much higher than the limit of level 1 (25%), indicating that its liquidity is relatively high. The current debt ratio is between 70% and 90%, which is level 4, meaning that the company has many liquid liabilities, leading to a mismatch between company assets and liabilities.

5.1.6 Sensitivity to market risk

The sensitivity to market risk can be calculated using the financial data of SQ company in 2019, that is:

Interest rate matching degree = (long-term assets-long-term liabilities) ÷ total assets

= (824,269.81-470,541.86) ÷2,220,828.82

=15.93%

SQ company's interest rate matching degree in 2019 is 15.93%, which is between 10% and 20%, and at level 2, indicating that the company has specific market risk management and control capabilities and market reflecting capabilities. The performance and cost of SQ company are seldom affected by the market.

5.1.7 Comprehensive evaluation analysis

The comprehensive evaluation of SQ company involves several indicators. Firstly, SQ company has sufficient capital, with level-1 capital adequacy. Secondly, the asset quality rating of SQ company is level 1, indicating high asset quality and adequate provisioning. Thirdly, all indicators reflecting the management level have reached regulatory requirements, and the rating is level 1. Fourthly, the overall earnings ability is strong, with the rating being level 1. Fifthly, the liquidity level is high, but the current debt ratio is also high, belonging to level 4. Sixthly, the sensitivity to market risk is at level 2. The thesis uses the arithmetic average method and arithmetic weighted average method to make a comprehensive rating. The arithmetic average method uses the average of the six dimensions of SQ company's rating results as the comprehensive evaluation value. The six dimensions are capital adequacy, asset quality, management, earnings ability, liquidity, and sensitivity to market risk. The weighted average method is to calculate after setting the weights of the company's asset quality and earnings ability to 20%, and setting the weights of the capital, management, liquidity, and sensitivity to market to 15%. The specific ratings are shown in Table 5.3.

Table 5.3 Comprehensive evaluation analysis of SQ company

	Capital adequacy	Asset quality	Manage ment	Earnings ability	Fluidity	Sensitivity to market risk
Rating result	Level 1	Level 1	Level 1	Level 1	Level 4	Level 2
The weight of the arithmetic average method	1/6	1/6	1/6	1/6	1/6	1/6
The weight of weighted average method	15%	20%	15%	20%	15%	15%
Comprehensive rating	Arithmetic average method 1.67			Weighted average method 1.6		

According to the comprehensive rating of the SQ company based on the CAMELS model, the company's overall risk is at level 1-2, which is relatively low. The company performs well in capital adequacy, asset quality, management, and earnings ability. However, the company still needs to be further improved in terms of liquidity and sensitivity to market risk. Meanwhile, the company needs to strengthen the management of liquidity risk and market risk.

5.2 Financial leasing of new energy commercial vehicles

Throughout the entire business process, financial risks of financial leasing companies mainly include financing risk, capital recovery risk, leased property value fluctuation risk. (G. Y. Zhang, 2003), among which financial risk is the most common one (L. J. Huang, 2018). In 2018, SQ company invested ¥11.413 billion in the financial leasing business, with the number of investment projects being 56,903. Among them, the investment amount of projects with a contract of less than one year (including one year) is ¥464 million, accounting for 4.06%, and the number of investment projects is 3,501, accounting for 6.15%. The investment amount of projects with a contract of 1-3 years (including three years) is ¥10.944 billion, accounting for 95.89%, and the number of investment projects is 53,380, accounting for 93.81%. The investment amount of projects with a contract of 3-5 years (including five years) is ¥0.05 billion, accounting for 0.05%, and the number of investment projects is 22, accounting for 0.04%. It can be seen that the company has only a few funds and projects with a contract of less than one year (including one year).

Meanwhile, according to the above-mentioned CAMELS rating, the liquidity liability of SQ company is relatively large. Therefore, like other peer companies, financial risk is also a significant risk faced by SQ company. This section analyzed the aspects of the financing model and capital operation, capital recovery risk, and leased property value fluctuation.

5.2.1 Financing mode and capital operation

The financial leasing industry is a capital-intensive industry. Its high leverage characteristics determine that a financial leasing company must rely on a large amount of external capital to obtain sustained high returns, and it isn't easy to rely only on the company's own funds for survival and development solely. SQ company has diversified external financing channels, including bond issuance, bank credit, inter-bank bond transfer, capital operation, asset securitization.

In terms of credit, SQ company has good credit. According to the company's bond

prospectus from 2020, the company has established a stable long-term partnership with East Asia Bank, Fubon Bank, Minsheng Bank, Ningxia Bank, Shanghai Pudong Development Bank, China Merchants Bank, and hence, the company gains an indirect solid financing capability. By the end of 2019, SQ company had obtained a total bank credit of ¥3.441 billion, and the unused credit limit was ¥1.779 billion. Besides, SQ company has also obtained credits from institutions including Ping An Trust, Industrial Trust, AVIC Leasing. By the end of 2019, SQ company has received a credit limit of ¥40.47 billion from inter-bank institutions, with an unused credit limit being ¥14.324 billion.

In terms of asset securitization, SQ company has successfully issued the phase-1 ABS in January 2015, the first financial leasing ABS (Asset-Backed Security, a financing method to raise funds by issuing bonds in the capital market. It is based on the asset owned by the project and guaranteed by the expected income of the project asset) after the execution of Shenzhen Stock Exchange new regulations. The phase-1 ABS has raised ¥482 million. Since 2015, SQ company has issued ABS many times to raise funds. In 2016, the company successfully issued phases-3 ABS, phase-4 ABS, and phase-5 ABS. In 2017, the company successfully issued phase-6 ABS, phase-7 ABS, and phase-8 ABS. By the end of December 2019, SQ company has issued a total of 20 asset securitization products (including 19 ABS and 1 ABN), with a cumulative issuance scale of ¥20.226 billion. Asset securitization has become a significant financing direction of SQ company.

In terms of bond financing, SQ company has been issuing corporate bonds since the end of 2015. In January 2016, the company raised ¥450 million through the issuance of 5-year corporate bonds. In October 2017, SQ company marched on the overseas market and issued $160 million bonds. As for increasing the capital and expanding the share, SQ company increased its registered capital to $157.6 million in 2012, $237.6 million in 2015, $337.6 million in 2017, and $500 million in 2018. Moreover, SQ company received ¥1 billion strategic investment from Baidu and Riverhead Capital in July 2018.

Because of the particularity of the financial leasing business, SQ company has been actively exploring multi-channel and multi-model financing channels since its establishment. Currently, asset securitization is the company's main financing direction. With the expansion of business, the company's debt scale has continued to increase in recent years. From the end of 2017 to the end of 2019, the total interest-bearing debt of SQ company was ¥11.724 billion, ¥12.107 billion, and ¥15.99 billion, and its asset-liability ratio was 86.86%, 84.58%, and 85.44%. Among the interest-bearing debt at the end of 2019, credit financing was ¥1.703 billion, accounting for 10.64%, and pledge financing was ¥14.296 billion, accounting for 89.36%. The debt ratio of

financial leasing companies is usually higher than that of other enterprises. At present, the short-term assets of SQ company can cover its short-term liabilities to a certain extent. However, due to the company's continuous business expansion, economic environment, industry environment, and debt overdue, the company still needs a large amount of cash flow to ensure normal operations. Therefore, multi-channel and multi-model financing is still a major issue faced by SQ company.

5.2.2 Capital recovery risk

Capital determines the survival and development of a company. On the one hand, financial leasing companies need a large amount of external funds to ensure the regular operation of their business. On the other hand, financial leasing companies also need to withdraw funds as planned to ensure the company's cash flow. For SQ company, the direct and indirect factors that affect the capital recovery are all possible risks, reflected in the following aspects.

Firstly, the business concentration is high, and the financial leasing business income constitutes a significant proportion. From 2017 to 2019, SQ company's financial leasing business income was ¥1.516 billion, ¥1.6 billion, and ¥1.996 billion, accounting for 98.49%, 93.57%, and 82.67% of the total operating income. Although the proportion of financial leasing business income is declining, it is still SQ company's primary income and the core component of the assets. High business concentration and relatively single business income could bring uncertainty to the continuous operation of SQ company. The financial leasing business income is mainly the lease repayment of the lessee. Suppose the lessee is affected by the macro environment or industry policies and cannot repay in full and on time as agreed. In that case, SQ company will face the capital recovery risk.

Secondly, the net amount of financial lease receivables is relatively large. According to the 2020 corporate bond prospectus issued by SQ company, from the end of 2017 to the end of 2019, the net financial lease receivables of SQ company were ¥12.872 billion, ¥13.108 billion, and ¥17.07 billion, with the proportion of the total assets at the end of the period being 84.25%, 76.93% and 76.58%. Although declining year by year, the ratios are still high. According to the characteristics of the financial leasing industry, financial leasing companies usually need to pay a large amount of cash at once during the company's business development, and then gradually earn a small amount of rent in the next 1-3 years, which leads to a negative cash flow. From 2017 to 2019, the net cash flow of SQ company was ¥-4.167 billion, ¥422 million, and ¥-3.159 billion. With the continuous return of repayments, the cash flow generated by the company's

operations may gradually become positive. If the company cannot remit in time, it will seriously affect its survival and operation.

Thirdly, the company's restricted assets are substantial, which can bring certain risks. According to the characteristics of the financial leasing industry, SQ company usually pledges the receivables generated by the financial leasing project to obtain bank loans and then uses the loan funds as the investment funds for the financial leasing project. Therefore, the financial leasing receivable of SQ company is the main restricted asset. By the end of December 2019, the restricted assets of SQ company were ¥17.376 billion, accounting for 78.24% of the current total assets. The company's usage of restricted assets is under strict limitations. If the company's operating conditions are affected, and the debts cannot be repaid in time, then the corresponding debts receivable will also face the risk of being transferred, which will seriously affect the company's capital recovery.

Fourthly, in the company's risk management system, new customers and accounts receivable are both under strict control and management to avoid the risk of extensive bad debts in accounts receivable. According to the prospectus of corporate bonds, from the end of 2017 to the end of 2019, the company's non-performing financial leasing receivables amounted to ¥94 million, ¥126 million, and ¥192 million. The non-performing asset ratios of the financial lease receivables were 0.72% and 0.94 %, 1.11%. Among SQ company's financial leasing receivables, the core of the commercial vehicle business (heavy trucks) accounted for the highest proportion, with 82.94%, 89.53%, and 95.01% in three years, closely related to the company's business focus.

Fifthly, the management risks faced by the company can lead to capital recovery problems or a capital loss. Management risk is mainly reflected in two aspects: operational risk and talent loss risk. In terms of operational risk, although SQ company has a rigorous risk management system and measure, man-made operational risks caused by external environment changes, insufficient awareness, and failure to strictly abide by the system during the business process may bring direct economic losses or other losses to the company. In terms of talent loss risk, in the increasingly competitive leasing industry, compound talents with knowledge of leasing, finance, trade, law, and finance are the key to the company's sustainable development and competition. Ignoring identity talent, use talent, and retention talent can easily lead to insufficient talent reserves, affecting the company's business development and cause fund problems.

5.2.3 Leased property value fluctuation risk

Leased property value fluctuation risk is mainly reflected during and after the leasing business. It is the value damage caused by the depreciation of commercial vehicles, improper maintenance, accidents. Leased property value fluctuation is also a risk faced by SQ company.

SQ company usually adopts the ten-year depreciation method commonly used in the industry; that is, the annual depreciation is 15% for the first three years, and after, the yearly depreciation is 10%. As new energy commercial vehicles are still developing rapidly, equipment such as the battery, battery management system, and electronic control system is updated quickly. Meanwhile, the liquidity ability after leasing is fast decreasing, affected by uncertainties in the market, liquidity, vehicle operating conditions, wear, accidents, and quality defects. The ten-year depreciation method adopted by the company may not apply to the depreciation calculation of new energy commercial vehicles. Therefore, SQ company faces a greater risk for the new energy commercial vehicle value fluctuations in its leasing business.

SQ company has established a comprehensive online transaction service platform for the second-hand commercial vehicle business that can conduct second-hand car transactions, auctions, financial services, after-sales services. At present, the primary vehicles of the platform are tractors, trucks, dump trucks, special vehicles. The platform can perform an intelligent valuation of used cars based on its database and information on vehicle conditions. However, the second-hand car transaction of new energy commercial vehicles has not yet been fully launched. China’s new energy commercial vehicles had officially entered production and sales in 2011. Considering the battery warranty period provided by mainstream automakers, the first batch of new energy commercial vehicles has just entered the second-hand vehicle market, so the entire industry has less accumulated vehicle data, transaction information, and transaction experience. Currently, there lacks a complete price evaluation system and the corresponding evaluation methods. Therefore, it is difficult for the trading platform of SQ company to evaluate.

Moreover, the new energy commercial vehicles operated by SQ company have large value fluctuations and difficult residual value assessments and have also a low-value retention rate. Affected by factors such as the development of intelligent technology for new energy commercial vehicles, mileage reduction, supporting facilities, and policy changes, the value retention rate is low, and the activity of second-hand transactions is also poor. Meanwhile, it is also challenging to deal with second-hand new energy commercial vehicles due to the narrowness of its commercial environment and usage scenario. That is a risk faced by the entire industry, which is also a risk faced by SQ company.

5.3 Environmental risk analysis

In addition to the capital source risk, capital recovery risk, and leased property value fluctuation that directly affect the financial status, SQ company is also affected by environmental risks due from market, policy, industry, contract, and strategy.

As for interest rate risk, the annual leasing interest rate of the financial leasing business set by SQ company is a certain percent higher than the benchmark interest rate of the People's Bank of China. During the contract period, if the benchmark interest rate is adjusted, the leasing interest rate and the rent charged by the company will be adjusted and changed accordingly, directly affecting the company's cash flow. Under the influence of the macroeconomic downturn in recent years, the benchmark interest rate of the People's Bank of China has been declining year by year, and the average return on total assets of SQ company has also decreased. From the corporate bond prospectus issued by SQ company in 2020, we highlight that the average return on total assets from the end of 2017 to the end of 2019 were 1.27%, 1.26%, and 1.17%. The gradual decline in the average return on total assets may affect the future earnings ability of SQ company, which will harm the company's operation and image.

As for industry competition risk, according to the *2018 China Financial Leasing Industry Development Report* released by the China Leasing Alliance, by the end of 2018, the number of financial leasing companies was 11,777, with an increase of 21.7% compared to 2017. There were 397 domestic-funded financial leasing companies, with the year-on-year increase being 41.8%, and there were 11,311 foreign-funded financial leasing companies nationwide, with the year-on-year increase being 21.3%. In addition to the growth in the number of financial leasing companies, registration is also increasing. By the end of 2018, the enrollment of financial leasing companies had risen by ¥3,276.3 billion, with the year-on-year increase being 5.4%. SQ company belongs to the first tier of domestic non-financial leasing companies in terms of leasing scale. Being a leading domestic enterprise in commercial vehicles (especially heavy trucks), SQ company has advantages in registered capital, source of funds, experience accumulation, data technology. However, the industry competition faced by SQ company is still fierce. Meanwhile, SQ company's financial leasing business in the field of new energy commercial vehicles is not outstanding enough. As the company is not mature enough in customer accumulation, experience accumulation, big data, and second-hand car transactions, SQ company is likely to be surpassed or even eliminated by competitors in such a competitive new energy commercial vehicle field.

As for policy risk is mainly the impact and risk brought by national economic policies and

industry control policies to the financial leasing industry. For example, the macro-control in 2004 has caused banks to shrink the credit range, leading to a substantial reduction or break in the primary funding sources of many financial leasing companies, which also triggered the collapse of a large number of financial leasing companies. Moreover, the national tax policies will also have an impact on financial leasing companies. The tax structure and tax rate will affect the cost of the financial leasing industry, which will also be included in the financial leasing rent. Changes in the tax during the contract will inevitably affect the income of financial leasing companies. With the release of policies such as *Announcement on Tax Issues Related to the Sale of Assets by Lessees in Financial Sale and Leaseback Business* and *The People's Bank of China Credit Information Center Financial Leasing Registration Rules*, the policy environment for financial leasing companies has become increasingly stable and perfect, but stricter supervision and uncertain changes may still trigger corresponding risks.

As for legal risks, China's financial leasing industry is still in rapid development. The penetration and maturity of financial leasing need to be improved, and relevant laws and regulations need to be clarified. Therefore, legal risk is a common problem faced by the financial leasing industry and is also the problem faced by SQ company. Moreover, SQ company usually requires customers to purchase corresponding insurance to resist asset losses during the contract period in the leasing business. In order to ensure safety, corresponding insurance can also be purchased for accounts receivable to resist the capital recovery risk. However, at present, insurance companies rarely provide such types of insurance, which makes the insurance protection of the financial leasing business incomplete. China has not yet established an insurance system for financial leasing, which is also an environmental risk faced by SQ company.

5.4 Chapter summary

Based on the pricing strategy and risk management theory of new energy commercial vehicle financial leasing, this chapter conducts field research on SQ company. Firstly, the chapter uses the CAMELS model to evaluate the overall risk situation of SQ company and concludes that its comprehensive risk is at a level of 1-2, which is relatively low. Secondly, the chapter analyzes the financial risks of SQ company from the aspects of financing model and capital operation, capital recovery risk, and leased property value fluctuation. Lastly, the chapter analyzes the environmental risks of SQ company from the aspects of interest rate risk, industry competition, policy risk, and legal risk.

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Chapter 6: Risk Coping Strategy and Risk Avoidance in the Case

6.1 Risk coping strategy

6.1.1 Diversify business income

Financial leasing companies' main profit comes from the interest spread income, that is, the difference between the company's rental interest income and its own interest expenses for financing. On the one hand, with the gradual increase in the debt cost of financial leasing companies, the marginal cost of the spread income is gradually decreasing. On the other hand, with the accumulation of the company's operating experiences, the increasingly mature cognition of the sub-industry, and the enhancement of resources integration capabilities, the company has been prompted to develop a diversified business. For example, financial companies can collaborate with customers through consultation, trade, supply chain finance, post-rental services, to increase the business income and competitiveness.

SQ company is engaged in the field of commercial vehicles. Based on a complete understanding of the industry and market, SQ company continuously discovers the needs of target customers. Using the advantages in the field of risk control, SQ company formulated diversified and personalized models and services in leasing and trading and also expanded the business areas and service boundaries to achieve multi-channel revenue and improve comprehensive profitability. According to Wan Jun, chairman of SQ company, China's financial market of commercial vehicles exceeds one trillion yuan, and the aftermarket services exceed two trillion yuan. Financial services in the vehicle sector can run through the entire industry chain. As a financial leasing company, it provides leasing business for terminal car owners and puts services in the inventory of auto manufacturers, upstream and downstream auto parts companies, and financing of dealers.

In 2018, SQ company made a strategic plan of "One Two Three Four" based on the development of the automobile industry and its situation. "One" is centered on one mission, that is, build SQ company into China's leading intelligent service platform for commercial vehicles. "Two" means relying on the two technologies of mobile Internet and big data to improve the level of risk control, increase the speed of approval, and provide full-cycle, multi-scenario services for commercial vehicles. "Three" stands for three service markets: financial market for commercial vehicles, aftermarket service market for commercial vehicles, and

logistics market for commercial vehicles. “Four” refers to stakeholders, including financial institutions, commercial vehicle dealers, individual car owners or drivers, and logistics cargo owners. Based on the “two” technical advantages, with the focus on the “four” stakeholders and “three” service markets, SQ company is constantly seeking and expanding its service content from the scenarios of commercial vehicle’s purchase, lease, operation, and maintenance. SQ company is providing the car owners and driver customers with a comprehensive solution of “no worries about buying and maintaining a car”, is providing the commercial vehicle suppliers with cooperation services in customer diversion and business cooperation, is providing related financial institutions with solutions for risk control services and lower-level channels, and is providing the logistics shippers with smart logistics solutions which are cost-reducing, efficiency-increasing, safe and reliable.

Under the guidance of the “One Two Three Four” strategic plan, SQ company uses its advantages and accumulation to actively seek cooperation with all participants in the automotive industry chain to expand its business areas and service boundaries. Taking advantage of its own commercial vehicle financial tools and transportation resources integrated by the business network, SQ company negotiated cooperation with Dongfeng Motor in 2017 to build a “super fleet” in the logistics industry. In this cooperation project, Dongfeng Motor provides solutions for vehicles based on needs such as transportation routes and transportation modes. Dongfeng also prefers maintenance to repairs and offers customized maintenance plans. Meanwhile, SQ company provides financial solutions and other supporting services based on customer conditions. In September 2018, SQ company, based on its knowledge and understanding of end-use vehicle customers, held a signing ceremony with Foton Daimler Motors, helping to serve Foton Daimler’s “tailor-made, smooth and worry-free” service upgrade project. Starting from the four links of vehicle - purchase, use, repair, and replacement - the project is mainly aimed at different industries and customers' actual needs. According to the specific business models and vehicle usage scenarios, the project launches exclusive customized services such as vehicle customization, financial product customization, operation management customization, route service customization, rescue service customization, second-hand car transaction service customization.

According to the 2020 corporate bond prospectus issued by SQ company, we can see the structure and proportion of its business income. The company’s main income items include financial leasing, loan facilitation, management and service fees, automobile sales, operating leasing. The primary financial leasing business income and the total operating income accounted for 98.49%, 93.57%, and 82.67% from 2017 to 2019, showing a downward trend

year by year. Among other business income items, the most apparent change is the company's loan facilitation business income. The proportion of loan facilitation business income to total operating income has increased from 2.22% in 2018 to 11.68% in 2019. This noticeable change is mainly due to the innovation of the financial leasing business model of SQ company starting in the second quarter of 2018. Under the innovative business model, SQ company recommends lessees for front-end financial institutions as asset managers and service providers. The financial institution directly signs loan contracts with customers, and SQ company receives a certain service fee from it. This innovative business model has brought considerable income to SQ company, which also helped to realize a business income of ¥37,980,100 in 2018 and ¥ 281,979,700 in 2019.

Financial leasing in China is still in the early stage of development, and single business and single income models are common problems faced by the current financial leasing industry (N. Ding, 2016; Z. Y. Lv & Du, 2013). The financial leasing industry has a multifaceted contribution to economic development, and the key to promoting the development of the financial leasing industry lies in the innovation of business models that integrate entities, finance, and trade. Financial leasing companies should use their endowments, broaden their horizons, carry out business innovations in the industry, expand service boundaries, and build a diversified income model.

6.1.2 Innovate the business model of new energy commercial vehicles

At present, China's new energy commercial vehicles face inadequate charging facilities, a bottleneck in battery technology, and high customer concerns. The financial leasing of new energy commercial vehicles is still in the early stage of development due to narrow financing channels, poor lease stability, difficult residual value evaluation, and poor social credit and risk control systems. Financial leasing companies engaged in the new energy commercial vehicle business are actively exploring new financial leasing business models. Among them, "vehicle and electricity separation", "value-preserved repurchasing + residual value leasing," and "asset manager cooperation system" is the most practical solutions to the problems.

SQ company focuses on the entire industry chain and life cycle of the vehicle for the financial leasing business of new energy commercial vehicles. Concerning the choice of new energy commercial vehicle brands, SQ company strictly controls every link, including technology research and development, production process, sales system, usage, recycling policy. Regarding the service of new energy commercial vehicles, SQ company adheres to the idea of

platform. Around the scenarios such as new energy commercial vehicle purchases, vehicle finance, after-sales operations, rescue services, charging network connection, maintenance and repair, residual value evaluation, second-hand transactions, the platform gathers business partners such as insurance companies, banks, battery operators, vehicle repairers. The platform provides customers with one-stop comprehensive services, so that customers have three guarantees (repair, rescue, and charging) and three management (insurance, qualification, training) when buying a car.

In the financial leasing business of new energy commercial vehicles, SQ company adopts the model of vehicle and electricity separation. Battery operators are introduced in the process, and the value of the vehicle and the power battery are separated to a specific ratio. When purchasing a new energy commercial vehicle, the customer only needs to pay for the vehicle, and then signs a financial leasing agreement with SQ company to obtain the right to use the vehicle and battery system. The battery operator owns the property of the battery and mainly provides customers with battery-related services such as daily operation, maintenance, replacement, and waste recycling. The vehicle and electricity separation model adopted by SQ company has reduced the one-time purchasing cost and solved problems such as the high cost of new energy commercial vehicles, unclear responsibility of battery service, after-sales service, and inadequate charging facilities. The vehicle and battery separation model has won the favor of customers and partners and has also provided favorable conditions for the promotion of new energy commercial vehicles. This model also brings another business model, which is the battery swapping model. With the development of battery swapping technology and the promotion of battery swapping models, the battery swapping model is increasingly recognized by the market. Meanwhile, the government is also actively removing policy barriers of battery swapping models and coordinating with new business models' recent problems.

“Value-preserved repurchasing + residual value leasing” is a simple and efficient new model of car purchasing. As the model can significantly alleviate customers’ car purchasing anxiety, it has become a business model suitable in the early stage of the new energy commercial vehicle market. The key to the success of the “value-preserved repurchasing + residual value leasing” lies in the definition of the residual value of new energy commercial vehicles. The second-hand market for fuel vehicles in China is still immature. The second-hand market for new energy commercial vehicles has hardly been formed, so few domestic institutions can analyze the residual value of new energy commercial vehicles. Since was focusing on commercial vehicles for years, SQ company has established a comprehensive online trading service platform for second-hand commercial vehicles. With professional evaluation and testing

teams, 108 testing standards, and multiple testing mechanisms, SQ company can provide the customers with services such as presentation, audition, after-sales, and finance of second-hand vehicles.

New energy commercial vehicles have entered the market for a short time and have the characteristics of rapid depreciation, small scale, and fewer data. By using the replacement cost method, SQ company separately evaluates the vehicle and battery to carry out the residual-value evaluation of new energy electric vehicles. In the residual value evaluation model of electric vehicles, the residual value is mainly composed of the reference and the assessed prices. The reference price is affected by factors such as brand, model, itinerary, and age. The assessed price is determined by factors such as maintenance record, performance, condition, and appearance. The reference price is relatively fixed, while the assessed price is more flexible. The calculation of the assessed price is based on the conversion of the primary new rate. As the battery has a greater impact on the cost of new energy commercial vehicles, the actual new rate is measured from the new rate of battery and the new rate of other parts. The new rate of power battery is mainly evaluated by SOH (state of health) index, and the new rate of other parts mainly considers vehicle age and mileage. On this basis, the model then corrects the new rate. The factors that affect the correction coefficient include physical depreciation, economic depreciation, and functional depreciation. Physical depreciation includes factors such as vehicle condition, nature of use, maintenance record, and fault record. Economic depreciation includes factors such as brand reputation and policy preferences. Functional depreciation includes one-time functional depreciation and operational functional depreciation.

The “asset manager cooperative system” adds the role of asset managers based on the traditional financial leasing model of suppliers, lessees, and lessors. The asset manager is mainly responsible for in-depth management and tracking of the new energy commercial vehicle operation, and is the guarantor of the lessee. The introduction of the asset manager can share the risks of the entire financial leasing business. Asset managers in the new energy commercial vehicle financial leasing business usually establish a professional vehicle management platform, and the lessee can use and operate new energy commercial vehicles more conveniently through this platform. Firstly, multiple charging networks can be connected through the platform, which can realize multi-platform and cross-platform charting and settlement and solve the difficulty of finding and using piles to charge new energy commercial vehicles. Secondly, asset managers can use their own experiences or background in OEMs to operate new energy commercial vehicles to fully coordinate vehicle maintenance resources, improve the integrity rate, and ensure everyday operations. Thirdly, the guarantee role of the

asset manager can improve the management quality of new energy commercial vehicles, monitor the condition of vehicles in real-time, ensure safety and maintenance, and reduce the business risks of financial leasing companies.

6.1.3 Improve the risk management system

In the context of tax subsidies, energy conservation, and emission reduction, under the sharp increase in urban logistics and deliveries, new energy commercial vehicles characterized with lower price and moderate cruising range have become the first choice of many logistics owners. As a result, the inventory of new energy commercial vehicles and the financial leasing companies engaged in new energy commercial vehicles is increasing rapidly. Although various financial leasing models are showing up, whether a financial leasing company can obtain a competitive advantage largely depends on the ability to manage risks. When the company's risk management system is continuously improved, then the company's regular operation and healthy development can be guaranteed. SQ company is constantly optimizing the risk management mechanism, risk assessment system, and risk handling methods.

6.1.3.1 Perfect the risk management mechanism

The management mechanism is the top design of a company's governance structure and supervisory system. A suitable governance mechanism is an essential foundation for risk management (Fang, 2007). Following the *Company Law*, SQ company has clarified the responsibilities of shareholders, board of directors, and supervisors and sorted out the resolution procedures, ensuring the legal compliance, truthfulness, and effectiveness of the company's major decisions. Regarding risk supervision, SQ company has made corresponding settings in the organizational structure. The company has set up two departments, namely, a risk management department and a risk supervision department, which are subordinate to the company's supervisors. The company has also set up the new energy commercial vehicle business department - which is responsible for the financial leasing business of vehicles; the credit review department - which is responsible for the investigation of team projects; the asset management department - which is responsible for the debt-collection, the credit review center - which is responsible for the credit review and debt-collection via telephone of the scattered orders, the risk management department - which is responsible for legal affairs and compliance work, and finally, the capital department - which is responsible for the company's financing and capital management. In general, the company's organizational structure matches its development. Each department has a clear division of labor and operates independently,

forming a pattern of mutual balances and support and managing and controlling the company's business risks. Meanwhile, the company has also established a corresponding risk management mechanism, which monitors risk control procedures and asset quality implementation through regular board meetings and internal audit mechanisms.

In order to strengthen the company's internal management and risk control, SQ company has established an internal control system that is compatible with its organizational structure. The internal control system covers the company's operation and management processes such as significant event decision-making, investment and financing management system, human resource management, financial management, and accounting. The system has formed a sound management system, which puts the company's various tasks on track. The company has established the business management system and process before, during, and after leasing, which has set up corresponding system regulations and process specifications for the approval of the credit review center, credit review management, loan management, and post-leasing management. For example, for overdue management, SQ company has established corresponding overdue collection systems and enforcement measures.

Once a leasing project is activated, SQ company will conduct monthly or quarterly risk assessments. The assessments mainly include the lessee's willingness and ability to repay, the risk of fund recovery, the use of new energy commercial vehicles, and value changes. For lessees who usually repay, the company will notify them in advance according to the agreed time and repayment method. For lessees who are overdue, the company will conduct corresponding overdue management based on specific circumstances. On an overdue day, the review center and the project manager will remind via phone to grasp the particular situation. After an overdue between one week and one month, the review center and the project manager will continue collecting the debt and choosing on site or through the guarantor. For projects overdue between one and two months, the project manager will work with the company's collection team to collect the debt, and different collection methods can be adopted. For projects overdue for more than two months, the company's collection team will take over the project and take measures such as litigation and forced withdrawal. The company will conduct liquidation processing through its second-hand car platform or through the liquidation and disposal team for the recovered leased property.

To remind and reduce the business risk of the enterprise, SQ company also prepares for bad debts based on the recovery possibility, risk of the financial leasing receivables, and *Enterprise Accounting System*. From 2017 to 2019, the provision for impairment of financial lease receivables by SQ company was ¥183 million, ¥249 million, and ¥319 million, with the

provision coverage ratios being 195.68%, 198.17%, and 157.16%.

6.1.3.2 Upgrade the risk prevention and control system

Financial leasing companies' risk prevention and control require efforts from both the management level and the implementation level. At the management level, the company should improve the risk governance mechanism and management system. At the implementation level, the company should combine manual management with big data, IT technology, and the Internet. The company's risk prevention and control system should also be upgraded to intelligently and automatically prevent and control risks, thereby increasing the company's business operation efficiency, improving the service quality to customers, and establishing a competitive advantage. The optimization and upgrading of the risk prevention and control system can be achieved for financial leasing companies by completing the following aspects.

Firstly, using big data. With the popularization of the Internet and the development of big data, data finance has developed rapidly in China, and financial leasing companies continuously start to use massive datasets to prevent and control risks. After several years of hard work and practice, SQ company has accumulated rich industry experiences and a large amount of data and has been allowed to access the corporate and personal credit system of the People's Bank of China. The accumulation of the data has laid an essential foundation for the company to establish a risk control model. In 2016, the company built its credit model, version 1.0, to assist in assessing customer credit risk. With the rising of third-party big data, datasets such as payment data, personal social data, operating data, credit data, vehicle GPS data, have provided a necessary basis for the upgrade of risk control models. In 2018, SQ company upgraded its credit model to version 2.0 to assess customer credit risk.

Secondly, establishing the risk control model. The establishment of the risk control system lies in adequate big data and depends on the risk control model. The risk control model mainly includes fraud detection, application scorecard, behavior scorecard, and collection scorecard. The fraud detection model is primarily based on cross-validation and cluster analysis to determine the customer's willingness to repay. The application scorecard is used in the customer loan application link. Based on the customer's past data, including basic information, debt information, consumption capacity, credit history, the application scorecard can predict the customer's future default probability. The application scorecard has a certain degree of stability and predictive ability and can distinguish the defaulting group from the standard group through the score. The behavior scorecard is used during the loan link. It predicts the default probability of the customer during the loan period based on the customer's behavior during the loan period.

The behavior scorecard is used to review the customer's credit limit, adjust the boundary management, review pricing and loan conditions, and formulate a corresponding collection strategy when the debt is overdue. The collection scorecard is necessary for the post-loan link. Different collection methods are adopted according to different kinds of overdue customers, composed by the repayment rate prediction model, the aging rolling model, and the lost contact prediction model. The repayment rate prediction model is used to predict the recoverable arrears ratio after collection; the aging rolling model is used to predict the probability of expected customers to change from mildly overdue to severely overdue, and finally, the lost contact prediction model is used to predict the likelihood that the customer will lose contact in the future.

In 2016, the International Finance Corporation (IFC), a member of the World Bank Group, signed a strategic cooperation with SQ company, one of which is to provide consulting services for SQ company to build a comprehensive risk management system and risk control model. On this basis, SQ company's data-driven risk control system has been put into large-scale use, which reduces the risk of default and economic losses and provides differentiated services to different customers based on the judgment of the system. SQ company will provide more favorable financing plans and faster approval channels for the company's high-quality customers. Since October 2017, the company's financial leasing business of trucks can have the first review results in seconds, and some products can even complete the entire review process within 3 hours. In 2018, with the participation of IFC risk control model experts, SQ company conducted a comprehensive review and optimization of its risk control system and model. Based on a large amount of customers data and other high-dimensional data sources, combined with the specific characteristics of its financial leasing business in the commercial vehicle field, SQ company began to build a collection scorecard system to improve and optimize the existing risk prevention and control system.

Thirdly, integrating with business systems. For financial leasing companies, the risk prevention and control system is not independent. It should be connected to the company's business system or integrated into the business management system to strengthen the judgment and identification of customer risks and improve the project establishment efficiency, approval efficiency, and review management efficiency of leasing business. SQ company upgraded its business system in 2017, allowing lessees to sign paperless contracts and greatly simplifying the operation steps of lessees on the system. Moreover, the business system equipped with a risk prevention and control model also realizes the company's effective prevention and control of risks in the process. For example, in the business project establishment process, the system

will perform credit ratings on customers based on the risk control model and automatically reject orders or push the order to project managers based on the rating. This way, the system can prevent and control possible risks in the business process before, during, and after the loan.

Fourthly, combining science and technology with manual management. No matter how powerful the technology of the financial leasing company is and how efficient the big data is, it is always people who conduct financial leasing transactions. Operators and participants in specific industries have uncertain credit risks, financial risks, and environmental risks. Therefore, the risk management and control of financial leasing companies require a combination of science, technology, and manual management. Besides integrating risk management and control into each business process to manage the risks based on their professional fields, SQ company also uses their accumulated experiences of professionals in sub-industry to launch different risk assessment strategies for different customers. As for the retail business, the company has more than 1,300 front-line employees. Deep in the city and county, these employees verify the lessee's background and operating conditions through on-site investigations and visits to confirm that the lessee's income can cover the rental expenses. On-site risk control combined with the company's default probability measurement model has become the unique risk control advantage of SQ company. As for the wholesale business of small and medium-sized logistics companies, the company's on-site investigation mainly relies on a team of analysts with rich industry experiences. The analyst team is very familiar with the business model and the logistics company's daily operations. By conducting on-site investigations, multi-party visits, data analysis, the analytics team gets to know the specific operation of the logistics company. By cooperating with the vehicle manufacturer, the analytics team gets to the matching degree of vehicles and customers and then completes the preliminary investigation of the project.

6.1.3.3 Improve the risk prevention and control system

Financial leasing receivables can quickly become non-performing assets that are difficult to recover. Non-performing assets are the "black hole" of corporate assets, and continuously growing non-performing assets can seriously affect the company's financial quality (X. P. Wang, 2004). For the management of non-performing assets, financial leasing companies can conduct collection or disposal by integrating internal and external resources through a dedicated department. Financial leasing receivables becoming non-performing assets is a problem in the entire financial leasing industry. Therefore, financial leasing companies need to explore the prevention and treatment methods continuously.

On the one hand, the guarantee company or risk agent can be introduced to deal with the non-performing assets. On the other hand, the company should increase channels for processing non-performing assets, enhance processing capacity and liquidity to minimize the processing losses of non-performing assets, and maximize the recovery of non-performing assets. Specifically, the company's risk treatment methods can be improved by employing the following aspects.

Firstly, introducing guarantee companies and guarantee systems. The guarantee methods of financial leasing companies usually include purchasing guarantee, leasing guarantee, financing guarantee, and judicial guarantee. Among them, leasing guarantees and judicial guarantees are the main methods to deal with non-performing assets. On the one hand, financial leasing companies usually have dedicated departments to manage the lessees' creditor rights and undertake capital and risk management pressure. If a guarantee company is introduced, the guarantee company can intervene in the management of the creditor right in the form of a guarantee when the creditor rights are formed so that the company's management pressure and capital recovery pressure can be shared. On the other hand, the financial leasing company can take judicial action for property preservation when the lessee has serious overdue. The judicial department will require the financial leasing company to provide a preservation guarantee during the preservation process. Moreover, if the financial leasing company did insufficient work in investigating customer qualifications in the early stage, then it can also entrust the guarantee company to explore the capabilities of potential customers. After signing the corresponding guarantee agreement, the guarantee company will be responsible for the management of the customer and the recovery of the creditor rights.

In order to transfer the leasing risks, SQ company has signed an equipment underwriting, which requires the lessee to purchase property insurance to transfer the risk of asset damage during the leasing period. The lessee usually bears the related insurance costs, and the lessor acts as the beneficiary of the insurance. Meanwhile, SQ company also purchases credit insurance for the financial lease receivables to transfer the lessee's risk of not paying rent as agreed. The introduction of guarantees and insurances can transfer the business risks of financial leasing companies and enable them to focus on financial leasing services, avoid the distraction on the main business, improve the company's operational efficiency, and achieve a win-win situation with the insurance companies.

Secondly, entrusting other institutions to conduct risk agency. For the projects that are still difficult to recover through compulsory liquidation and legal proceedings, financial leasing companies can authorize other social institutions to deal with the non-performing assets.

Entrusting other institutions to carry out risk agencies usually does not require the financial leasing company to pay in advance. After third-party institution recovers part of or all of the funds, the expenses will be settled by a certain proportion. The financial leasing company will eventually get a certain amount of income due to the disposal of non-performing assets. The risk agency system can effectively borrow external resources to help financial leasing companies deal with non-performing assets that are difficult to recover.

Thirdly, establishing recycling and cashing mechanisms for second-hand equipment. For seriously overdue customers, financial leasing companies take measures to recover the leased equipment by compulsory collection. The recovered leased equipment also needs to be cashed to reduce the company's financial losses. SQ company serves the entire life cycle of commercial vehicles. SQ company builds a trade and auction platform for used commercial vehicles, which can be used to process the company's recovered used vehicles and help commercial vehicle buyers and sellers to deal with used cars. Besides the online trading platform, SQ company also set up a disposal center in the second-hand car market to ensure the withdrawal and cashability of the company's recovered second-hand cars. For other financial leasing companies that have not yet established a trading platform for second-hand equipment, seeking ways to cash second-hand equipment is a meaningful way to recover leasing costs.

6.2 Risk transferring: pricing strategies

Companies in the financial leasing industry cannot avoid risks. In addition to preventing and controlling business models and risk control systems, financial leasing companies can also incorporate risk premiums into product prices, that is, transferring risks through appropriate pricing strategies. For different types of financial leasing businesses, the pricing strategy of risk transferring is also different.

For traditional leasing models such as direct financial leasing and after-sales financial leasing, product prices can be set according to the formula:

$$\boldsymbol{F = f(x_1; x_2; x_3; x_4 \ldots\ldots)} \tag{6.1}$$

The pricing result is a comprehensive pricing plan that combines multiple elements. In the above formula, F represents the comprehensive price plan, X1, X2, X3, X4...respectively represent elements such as: the principal amount, interest income, margin, handling fee, risk cost, n-period expected income, insurance cost, leasing term, rental payment method, n-period rental income, and rental payment method. Different leasing industries will use different risk factors for pricing in terms of risks, which depends on the business nature and customer ratings.

The risk factors that are usually considered include equipment risk and credit risk. The measurement basis of equipment risk mainly includes residual book value, fair market value, and historical sales value. The control of equipment risk lies in assessing future residual value and the cashability of second-hand equipment. The measurement of customer credit risk relies on data such as: basic information, debt information, consumption capacity, credit history, behavior during the lease. The key to preventing and controlling risks is carrying out a credit risk premium based on the customer data and combined with risk prevention and control.

The pricing principle of new energy commercial vehicle financial leasing products of SQ company is given by the following rule:

$$HR=CF+MC+RP+TY$$

Where, HR is the price of financial leasing products, which includes the cost of capital (CF), management cost (MC), risk premium (RP), and target yield (TY) of the financial leasing company.

In the financial leasing of new energy commercial vehicle, SQ company bases on the above pricing principle and considers factors such as capital cost, management cost, target yield, leasing term, financing cost, return on capital, taxation, credit risk, liquidity risk, probability of default, industry and regional risk. The pricing model of SQ company is:

$$\boldsymbol{HR} = \mathbf{CF+LRP+IRP+RRP+}\frac{\mathbf{OCR}}{\mathbf{1-BTR}}+\frac{\mathbf{PD\times LGD}}{\mathbf{1-BTR}}-\frac{\mathbf{BRT\times RCR}}{\mathbf{1-BTR}}+\frac{\mathbf{(MRAROC\times ECR)/(1-ITR)}}{\mathbf{(1-BTR)}} \tag{6.2}$$

There is a mismatch between the capital period and the lease period because the capital of the financial leasing company comes from the external market. Therefore, when calculating the cost of funds (CF) in the above pricing model, we can first refer to the borrowing interest rate and the cost of excess capital in the same period, then carry out weighted calculations and make a premium on liquidity risk and credit risk. The formula for cost of funds (CF) is:

$$\mathbf{CF=BC\times(1-ECR)}+\frac{\boldsymbol{(MRAROC\times ECR)/(1-ITR)}}{\boldsymbol{1-BTR}} \tag{6.3}$$

BC is the bailout cost, ECR is the excess capital ratio, MRAROC is the minimum risk-adjusted return of capital, ITR is the income tax rate, and BTR is the business tax rate.

In the above pricing model, risk premium (RP) is mainly reflected by liquid risk premium (LRP), industry risk premium (IRP), regional risk premium (RRP), and credit risk premium (CRP). The expression of the credit risk premium (CRP) is:

$$\boldsymbol{CRP=(PD\times LGD)/(1-BRT)-(BRT\times RCR)/(1-BRT)} \tag{6.4}$$

Among them, PD is the probability of default, LGD is the loss given default, and BRT is the return rate before tax in the validity period.

In the above pricing model, the target yield (TY) is expressed by the following formula:

$$\boldsymbol{TY = \frac{(MRAROC \times ECR)/(1 - ITR)}{(1 - BTR)} - (BRT \times RCR)/(1 - BTR)} \quad (6.5)$$

Among them, RCR is the risk coverage ratio, and $(BRT \times RCR)/(1 - BTR)$ is the expression of risk capital ratio, which is the ratio of capital used to cover unexpected losses to risk assets. In the above pricing model, management cost (MC) is expressed by $\frac{OCR}{(1-BTR)}$, and OCR is the operating expense ratio.

Expression (6.2) is integrated from expressions (6.3) (6.4) (6.5), which is the basic model of SQ company's product pricing. With the innovation of the new energy commercial vehicle financial leasing business model and the diversification of the services, factors such as follow-up maintenance services are also considered based on this pricing model. Therefore, the pricing plan can be expressed as:

$$\boldsymbol{F = f(x_1; x_2; x_3; x_4 \ldots\ldots) + f(A + B + C)} \quad (6.6)$$

A is the company's handling fee, B is the maintenance fee provided by the company, and C is the other fee collected by the company. If the financial leasing company offers the repair and maintenance of the new energy commercial vehicle battery, the related expenses also need to be calculated.

For other types of financial leasing models, the pricing plans are also different. For example, the risky financial leasing model integrates financial leasing and venture capital, so the pricing plan usually includes fixed rent, shareholders' equity, and residual value equity based on the actual situation of the lessee. The shareholders' equity of a financial leasing company includes two options. The first option is to have a certain number of shares when the financial lease contract is signed. The other option is to have a certain number of shares of the lessee at a specific time in the future.

6.3 Chapter summary

This chapter focuses on the financial and environmental risks of SQ company and analyzes the risk coping strategy and risk transferring strategy of SQ company. The risk coping strategies mainly includes diversifying business income, innovating new energy commercial vehicle business models, and improving the risk management system. Among them, the improvement of the risk management system includes measures such as perfecting the risk management mechanism and system, upgrading the risk prevention and control system, and improving the risk treatment methods. As for the risk transferring strategy, this chapter analyzes the pricing strategy of SQ company, which is to transfer risk through product pricing.

Chapter 7: Research Conclusions and Research Prospects

Taking SQ company as the research case, the thesis focuses on the financial leasing business of new energy commercial vehicles and conducts research on the main risks faced by the company as well as the corresponding countermeasures. Based on the relevant theories of financial leasing companies' financial and environmental risks, this thesis analyzes the main risks faced by the company. Combined the pricing strategies of financial leasing products and the characteristics of new energy commercial vehicle financial leasing, this thesis put forward the coping strategies and risk transferring strategies for financial leasing companies according to financial risk management and environmental risk strategy theories. This chapter firstly sorts out the conclusions on the risks and the coping strategies in new energy commercial vehicle financial leasing, then points out the research limitations and future research prospects.

7.1 Research conclusions

After more than 30 years of development in China, financial leasing industry has greatly improved in terms of the enterprise number, business volume, law and policy, and market environment. Financial leasing has contributed to optimizing resource allocation, supporting enterprise development, accelerating technical transformation, and promoting economic growth. In particular, considering the new energy commercial vehicle industry, which is at the early stage of development, we affirm that financial leasing has played an essential role in its development. On the one hand, financial leasing can lower the buyer's threshold for buying cars and ease the pressure of one-time payment. On the other hand, financial leasing can integrate the resources of the entire industry chain through business innovation, reduce the promotion and capital pressure of new energy commercial vehicle manufacturers, share the management risks and financial risks of the financial leasing company. As an innovative financial product that integrates trading, financing, and asset, financial leasing has worrying risks due to its complex nature and to the market environment. With immature technology and inadequate infrastructure, the companies engaged in the new energy commercial vehicle financial leasing business will inevitably face risks.

SQ company is engaged in the financial leasing business of new energy commercial vehicles. This thesis takes SQ company as the research object and masterminds the research

following the roadmap of "discovering problems-raising questions-analyzing problems" and the research idea of "literature review-basic theory-status quo analysis-problem discussion-proposal". Concerning the risk theory of financial leasing, we employ the CAMELS evaluation model and the pricing strategy. Further using the case study research method, adopting the collection, processing, and analysis of primary and secondary data, and combining the theory and the case, the thesis came to the following four conclusions based on the previous chapters.

(1) The main risks in the new energy commercial vehicle financial leasing business are financial and environmental. Capital is the starting point of corporate activities and the foundation of corporate operations. The first risk faced by the new energy commercial vehicle financial leasing industry is the financial risk, which is directly related to capital. Financial risks are closely related to corporate operations, which exist in the entire corporate operations and are in a constantly changing state. Financial risks mainly include financing risks, capital recovery risks, and value fluctuation risks. The second risk faced by the new energy commercial vehicle financial leasing business is the environmental risk. Companies could not survive and develop without the environment, so they must adapt to changes in the environment and seek survival and development. Factors such as the policy environment, legal environment, economic environment, and market environment are all environmental risks affecting relevant practitioners.

(2) According to the financial and environmental risks faced by the new energy commercial vehicle financial leasing companies, the CAMELS model conduct a comprehensive risk assessment to quantitatively evaluate the company's capital adequacy, asset quality, management, earnings ability, liquidity, and sensitivity to market risk, which can provide a factual basis and essential references for further risk analysis, problem discussions, and risk management proposals.

(3) Through the analysis of the financial and environmental risks of the new energy commercial vehicle financial leasing business of SQ company, based on the calculation of indexes such as capital adequacy, asset quality, management, earnings ability, liquidity, and sensitivity to market according to the CAMELS model, the company's capital adequacy, asset quality, management, earnings ability, liquidity, and sensitivity to the market risk, risk coping strategies of SQ company were proposed combined with the current situation of the company. Coping strategies mainly include diversifying business income, innovating new energy commercial vehicle financial leasing business models, and improving the risk management system. Improving the risk management system comprises perfecting risk management mechanisms and systems, upgrading risk prevention and control systems, and enhancing risk

treatment methods.

(4) Besides actively exploring risk coping strategies in business model and internal management, companies engaged in the financial leasing business of new energy commercial vehicles can also explore risks in terms of the pricing strategy based on the product and price characteristics of new energy commercial vehicles. For SQ company, which mainly focuses on the direct financial leasing model and the after-sales financial leasing model, the minimum pricing plan of the product is set according to the formula $F = f(x_1; x_2; x_3; x_4.....)$. The pricing result is a comprehensive pricing plan, which considers the following factors: principal amount, interest income, deposit, handling fee, risk cost, n-period expected return, leasing term, rent payment method, n-period rental income, rent payment method. In terms of risk factors, financial leasing companies can use different risk factors for pricing based on the business nature and customer ratings. The risk factors that are usually considered include equipment risk and credit risk.

7.2 Research limitations

This thesis focuses on the risks in the new energy commercial vehicle financial leasing business. Taking SQ company as a study case, the research is developed around the main risks faced by the company and the countermeasures. The thesis concluded that risks in the new energy commercial vehicle financial leasing business mainly include financial and environmental risks. The dissertation also proposed the coping strategies of risks and the idea of transferring risks through pricing strategy. The conclusions have theoretical and practical guidance significance for SQ company and other companies engaged in the new energy commercial vehicle financial leasing business. However, there are still two limitations in this research, which require deeper discussion and further exploration in the future.

For the first limitation, the research adopts a single-case method to study the risks and pricing strategies of the financial leasing business in the field of new energy commercial vehicles. However, for SQ company, the research case of the thesis, the new energy commercial vehicle financial leasing business is only one of the company's business segments. Meanwhile, the vehicles of SQ company are mainly new energy commercial vehicles. Although the financial risks and environmental risks faced by SQ company in the financial leasing business are common problems faced by the entire industry, different companies may have an additional focus on financial risks and environmental risks and may apply other solutions due to their backgrounds, resources, and accumulated advantages. For example, for seriously overdue

customers, SQ company takes back the leased equipment through mandatory clearance measures, and the recovered leased equipment is realized through the self-built platform for second-hand commercial vehicle trade and auction. For other peer companies, the leased equipment can be realized through other methods. Therefore, whether the conclusions drawn in this thesis can be generalized to other peer companies is a question that still needs to be explored.

For the second limitation, the research data is a mismatch with the company's development. Most of the financial data, market data, and business data involved in this research describe the company’s situation in the last three years. The data comes from the corporate bond prospectus issued by SQ company and the interviews with the relevant people in charge of the company. However, the risks faced by SQ company and the corresponding solutions have undergone significant changes over time. The company’s strategies and tactics are being adjusted, the business segments and revenue ratios are changing, the risk prevention and control system are becoming more intelligent with the accumulation of big data. At different stages of development, the company has different business priorities, business positionings, and degrees of tolerance. The risk coping strategies and risk transferring strategies proposed in this thesis are based on the current financial and environmental risks. The thesis ignores the time factor and the company’s tolerance of the risk coefficient, which is another limitation.

7.3 Research prospects

With the advent of the new energy era, new energy commercial vehicles have become the choice of more and more end customers, and the financial leasing business of new energy commercial vehicles is developing and prospering. Facing the individualized and diversified needs of different customer groups, new energy commercial vehicles' financial leasing business models also need continuous innovation to provide better services and products. Risks are always accompanied, whether it is a traditional financial leasing model or a novel one. For financial leasing companies, how to discover risk issues, analyze risk issues, and resolve risk issues is an eternal problem facing the company. The thesis focuses on traditional leasing models such as direct leasing, sale, and leaseback and analyzes financial, environmental, and corresponding risk strategies. For other innovative financial leasing models, what type of risks the company will face and how to solve the risks will be a direction for future research.

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Annex

Interview protocol

I. Introduction

Thanks for taking your time to have the interview!

Let me briefly inform you about the interview which is part of the data collection in my doctoral thesis. We have observed that financial leasing can increase the market penetraton rate of new energy commercial vehicle. However, due to the limited pricing strategy and risk management capability, new energy commercial vehicle is full of risks. Through this research, we want to find a new way to solve this pain point. Our interview protocol has been sent to you before, please be free to ask us if you have any questions or incomprehension.

We promise that: during the interview as well as in my future thesis and published papers, your name will be covered up; the interview will be only used for research data analysis and kept confidential.

II. Interview questions

1. What is the basic situation of SQ Company?
2. What are the main businesses of SQ Company?
3. What is the main content and direction of new energy commercial vehicle business? Do you think it will become the company's main business direction in the future?
4. What type of financial leasing business can new energy commercial vehicle business provide for customers? What are the corresponding processes?
5. Besides financial leasing business, what additional services can the company and the new energy commercial vehicle business provide for customers? Will customers choose the additional services launched currently?
6. What are the risks in the current business model and business process? How to prevent and manage it?
7. What factors are mainly considered in the pricing of the company's products?
8. Is the pricing of the company’s products competitive in the market? How is the customer satisfaction?

9. Do you think your colleagues strictly follow the company's systems and regulations when preventing and controlling business risks?
10. What do you think of the company's salary and atmosphere? How's the working years and the loss of key personnel in the department?
11. How does the company calculate the depreciation of new energy vehicles?
12. What are the main ways to deal with leased items that are forcibly recycled by the company?