

# Changes in Tax Burden, Solvency, Profitability, Operating Ability and Growing Ability: A Factor Analysis of China International Logistic Companies

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## ABSTRACT

Amid the expansion of global trade, China's prominence in international commerce is clear, yet its international logistics companies face significant challenges related to tax risks and financial stability. This study examines the financial performance and tax risk of the international logistics sector in China, focusing on key indicators of tax burden, solvency, profitability, operational efficiency, and growth capacity. Employing factor analysis on data from 28 listed logistics firms in China from 2020 to 2022, the study investigates the interrelationships and overall impact of these indicators. The findings reveal that tax burdens exceed industry standards, solvency is weak, and profitability is influenced by both internal and external factors. Additionally, operational efficiency and growth capacity show significant gaps. This analysis identifies critical areas where logistics companies should adopt adaptive tax strategies, optimize debt structures, and invest in operational efficiency to enhance long-term sustainability. Strategic agility in responding to market trends is crucial for capitalizing on growth opportunities, particularly among logistics companies where these actions will strengthen financial performance and global competitiveness.

**Keywords:** Logistics company, Tax Burden, Solvency, Profitability, Operating Ability, Growing Ability.

## INTRODUCTION

### Research Background

International logistics in international trading is a link between production and sale, therefore it is a crucial element of all business operations. International logistics involves the cross-border flow of goods and services and is an important part of international trade (Shao, 2014). It includes various activities such as transportation, warehousing, and inventory management, all of which are crucial for the smooth flow of goods in the global market (Huang, 2013). The efficiency and effectiveness of international logistics directly affect the cost and speed of international trade, making it a key determinant of a country's competitiveness in the global market (Zhang, 2008). In agreement, Qi (2016) claims that international logistics is the pillar of international trade, where both are closely linked.

With the continuous development of global trade, China has developed rapidly in international trade. According to the World Trade Organization, total global trade in goods reached \$28 trillion in 2023. Among them, China's total import and export volume reached 5.94 trillion US dollars, 0.75 trillion US dollars ahead of the United States, maintaining first place in global goods trade for seven consecutive years (Global Trade Prospects and Statistics, 2023). In addition, in the two years since the implementation of the Regional Comprehensive Economic Partnership (RCEP) in 2022, the cost of regional trade has been significantly reduced. The advantages of tariff reduction and trade facilitation brought about by RCEP have strengthened the links between regional and global industrial and value chains and promoted economic growth. Emmanuel Linga, a senior official at the Foreign Trade Policy Center of the Indonesian Ministry of Trade, believes that based on China's important position in the global value chain, China's implementation of RCEP will help enhance the resilience of regional and global value chains (United Nations Conference on Trade and Development, 2021).

In recent years, driven by the expanding global economic and trade influence, the trading volume and revenue of China's international logistics company have achieved significant growth. The scale of China's international logistics demand has recovered steadily, benefiting from the global economic recovery and the continuous growth of China's foreign trade. In 2023, the logistics trade volume between China with other countries and regions along the Belt and Road is expected to reach 5 trillion yuan. From 2020 to 2023, China's cross-border e-commerce exports are expected to reach 1.9 trillion yuan, an increase of about 13% year-on-year (KPMG, 2023). The rapid growth of cross-border e-commerce logistics demand has led to the rapid development of cross-border e-commerce logistics companies. In general, China's international logistics company has maintained a steady development trend in the past three years, showing strong resilience and development potential.

Although China's international logistics companies have made great progress, they also face some challenges in terms of tax risks and financial management, which may affect the profitability, solvency, operational efficiency, and growth of the companies (Li et al., 2016). For example, in terms of the tax burden, international logistics companies need to pay several taxes, such as customs duties, value-added tax, and corporate income tax, which have a certain impact on the profitability of companies. According to statistics, the average profit margin of China's international logistics companies in 2022 is only about 5%, far lower than the average profit margin of other industries (Deloitte, 2022). In terms of solvency, Li and Zhang (2018) proved that international logistics companies often need to invest a large amount of funds for fixed assets acquisition and working capital turnover. In 2022, the average asset-liability ratio of China's international logistics companies is about 60%, higher than the average level of other industries, making the company's debt repayment pressure greater (Wang, 2022).

In terms of profitability, Yang and Lu (2015) claimed that due to the fierce competition in the international logistics company, the profit margin is generally low. In addition, fluctuations in oil prices, exchange rates, and other factors will also affect the profitability of companies. According to statistics, the average profit margin of China's international logistics companies in 2022 is only about 5%, far lower than the average profit margin of other industries (Zhang, 2022). In terms of operation, efficient operating can help companies reduce costs, improve profit margins, and enhance their competitiveness. Good operation capability can ensure the high quality of logistics services, win the trust of customers, and expand market share. In terms of growth, China's international logistics company has developed rapidly in recent years, showing good growth. For example, in 2022, the size of China's international logistics market will reach about 4 trillion yuan and is expected to maintain rapid growth in the next few years (China Federation of Logistics and Purchasing, 2022).

Past studies surrounding these areas have shortcomings. Most of the existing studies have focused on manufacturing companies, real estate companies, and other industries. There is a lack of in-depth discussion on the logistics companies. We argue that it is necessary to add to the literature studies that focus on analyzing logistics companies due to the distinct role that they play in global trade. In order to better serve the construction

of a new pattern of trade development, not only does the modernization of the international logistics companies need to keep pace, but the extension of the research in the logistics industry is also in dire need, particularly in the context of growing demand for global trade. Moreover, past studies have shown a lack of dynamic analysis of the impact of tax policy. For instance, most of the existing studies focus on the short-term impact of tax policy changes, such as the impact of “replacing business tax with value-added tax” on corporate financial performance in the year when the policy is implemented. However, in the long run, companies may respond to tax policy changes by adjusting their business strategies. With the growing demand and volume of international trade in addition to the gradual increase of tax supervision by domestic tax authorities, the stakeholders should be made aware of the tax risk faced by the international logistics companies and how it impacts the financial management of the companies.

Considering the gaps mentioned above, the main objective of this study is to analyze the changes among international logistics companies in China in terms of tax burden, solvency, profitability, operating ability, and growth ability as indicators of financial and tax risk using a factor analysis. This study mainly uses factor analysis to study the current tax risks and financial performance of China's international logistics company, especially the relevant impacts on tax burden changes, solvency, profitability, operating capacity, and growth capacity, so as to prevent and control tax risks. According to the literature review in recent years, many domestic scholars have adopted factor analysis methods for tax risk assessment and performance evaluation. For example, Liu (2022) assessed the tax risk of the food manufacturing company based on factor analysis. Xi Guangxu (2020) evaluated the financial performance of iFlytek based on factor analysis. Based on the aforementioned scenarios, China's economic setting is deliberately selected for this study. China's logistics companies are embracing technological advances, including automation, artificial intelligence, and big data analytics. These innovations are changing the supply chain and affecting financial performance. Therefore, research into the financial health of the company is necessary. This study is of great value to China's international logistics companies, company stakeholders, and the wider research community, providing an understanding of the factors that include tax burden changes, solvency, profitability, operating capacity, and growth capacity surrounding corporate risks.

## LITERATURE REVIEW

Changes in tax burden, solvency, profitability, operating ability, and growing ability are essential for assessing a company's financial health and operational effectiveness. Understanding these concepts and their theoretical foundations enables businesses to make informed strategic decisions, optimize performance, and ensure long-term sustainability. By analyzing these indicators, companies can navigate the complexities of the business environment, adapt to challenges, and capitalize on opportunities for growth. Tax burden is a complicated economic phenomenon, which is affected by many factors. Understanding the tax burden is crucial for businesses as it directly impacts their profitability and investment decisions. Research indicates that changes in the tax burden can significantly affect economic behavior, influencing decisions related to investment, consumption, and labor supply. For instance, higher corporate taxes may discourage investment, while lower personal income taxes can stimulate consumer spending. Studies have shown that tax burden changes can have significant implications for economic growth. For example, Celikay (2020) found that macroeconomic indicators, such as GDP per capita and unemployment rates, significantly impact the tax burden across OECD countries. This suggests that as economies grow and evolve, so does the nature and extent of their tax burdens, which can influence overall economic performance and public policy decisions.

The theory of solvency is closely related to the concepts of liquidity and financial leverage. While liquidity focuses on short-term obligations, solvency addresses long-term financial stability. A company is considered solvent if its total assets exceed its total liabilities. High levels of debt can increase financial risk, particularly if a company's earnings are volatile. Conversely, a company with a strong solvency position can secure better

financing terms and have greater flexibility for growth and investment. Research has demonstrated that solvency is a critical factor in corporate performance. For instance, a study examining the relationship between solvency and profitability found that companies with higher solvency ratios tend to exhibit better financial performance, as they are perceived as lower risk by investors and creditors. Theories of profitability often involve Porter's Five Forces model, which analyzes competitive forces that affect a company's ability to earn profits. Factors such as market competition, supplier power, buyer power, threat of substitutes, and the threat of new entrants can significantly influence profitability. Additionally, profitability is impacted by operational efficiency, cost management, and pricing strategies. Companies that effectively manage their resources and optimize their operations tend to achieve higher profitability. Research indicates a strong relationship between profitability and tax burden. For example, a study by Chang et al. (2021) found that higher corporate income tax rates negatively correlate with profitability measures such as ROE, suggesting that increased tax liabilities can erode profit margins and overall financial performance.

The concept of operating ability is linked to operational excellence and lean management principles. Companies that excel in operating ability can respond quickly to market changes, reduce waste, and improve customer satisfaction. Operational efficiency can be enhanced through techniques such as just-in-time inventory management, process automation, and continuous improvement practices. Companies that focus on their operating ability often achieve a competitive advantage in their company. Studies have shown that strong operating ability is associated with improved financial performance. For instance, a study indicated that companies with higher operating efficiency tend to have better profitability and solvency ratios, demonstrating the interconnectedness of these financial metrics. Theories of growth, such as Gibrat's Law and the Resource-Based View (RBV), provide insights into how companies grow. Gibrat's Law suggests that the growth rate of a company is independent of its size, while the RBV emphasizes the importance of unique resources and capabilities in driving growth. Companies with strong growing abilities can adapt to changing market conditions, innovate, and leverage strategic partnerships. Sustainable growth often requires a balance between reinvesting profits, managing risks, and maintaining operational efficiency. Research has indicated that growing ability is influenced by both internal factors (such as operational efficiency) and external factors (such as market conditions). For example, a study found that companies with strong operational capabilities are better positioned to exploit growth opportunities, leading to enhanced market share and profitability over time.

## Existing Research

The change in tax burden is an important factor affecting the financial performance of companies. With the advancement of tax reform, the tax burden borne by companies has changed significantly, especially in China's international logistics company. The change in tax burden not only affects the cash flow and profitability of companies but also has a profound impact on their investment decisions and market competitiveness. Yupin and Rui (2021) studied the changes in tax burden in China's logistics companies and found that tax reform led to a decline in the overall tax burden of companies, but financial performance (such as ROE) declined due to excessive investment in fixed assets. This study highlights the direct impact of tax policy on corporate profitability. Solvency is an important indicator of a company's long-term financial health, usually measured by debt-to-equity ratio and interest coverage multiple. Good solvency means that a business can meet its financial obligations as it matures, thereby reducing the risk of bankruptcy. Brigham and Ehrhardt (2016) point out that companies with strong solvency are usually able to obtain better financing conditions, thus promoting their long-term development. The research shows that there is a significant positive correlation between solvency and corporate performance. In China, studies of logistics companies have shown a close relationship between solvency and profitability. Hanaffie (2017) studied the impact of liquidity and solvency on the profitability of listed consumer goods companies in Malaysia and found that good solvency can significantly improve the financial performance of companies.

Profitability is a measure of a company's ability to create profits in a certain period of time, and commonly used indicators include profit rate, return on assets (ROA), and return on shareholders' equity (ROE). Profitability is an important basis for the sustainable operation and development of companies. Chang et al. (2021) studied the negative correlation between the increase in corporate income tax rate and profitability (such as ROE), indicating that the increase in tax burden will have a negative impact on corporate profits. In China's international logistics company, the improvement of profitability is closely related to the reasonable control of tax burden. Research shows that companies can effectively improve their profitability by optimizing their tax structure and improving operational efficiency. Efficient operational capabilities can help companies reduce costs and improve customer satisfaction. Slack et al. (2010) point out that businesses with high operational efficiency are generally able to achieve better financial performance and market competitiveness. The research shows that the operation ability of a company is closely related to its profitability and solvency. In China's logistics company, research has found that strong operational capabilities can significantly improve a company's market competitiveness and financial performance. By optimizing operational processes and improving resource utilization efficiency, companies are able to stand out in a highly competitive market.

Strong growth ability can help companies to hold an advantage in the competition. Penrose (1959) pointed out that the growth of a company is not only dependent on market opportunities but also closely related to the effective allocation of its internal resources. In China's logistics company, research shows that the growth ability of companies is influenced by both internal and external factors. In addition, Gibrat's law holds that the growth rate of a company has nothing to do with its size, and this theory has been verified in China's logistics company. It is found that companies can achieve sustained growth and expansion through effective resource management and marketing strategies. Since the implementation of the logistics industry tax reform, various studies have emerged. Xia Dongming believes that under the new situation of tax reform, the original tax plan will no longer be used, and logistics enterprises should timely adjust the tax planning plan according to the new policy to maximize the interests of enterprises (Xia, 2014). Li (2011) believed that the "nine countries" played a great role in reducing the cost of commodity circulation and the tax burden of logistics enterprises. Xi (2012) believed that some high proportion of costs could not be deducted, and the VAT rate was high, resulting in a high tax burden. Wang (2014) believed that the tax burden showed the characteristics of the overall rise of the industry, especially the transportation industry and logistics auxiliary industry.

The main reason for the increase in tax burden is the lack of comprehensive tax system design, which is reflected in the limited scope of VAT deduction and the high tax rate. From the perspective of the development of VAT, the conceptual prototype of VAT was originally proposed by Siemens in 1921. Oskar (2011) believed that the reasonability of the tax system will affect the operation of the social supply chain, and a reasonable tax system is conducive to the effective operation of the social supply chain. Anthony (2012) believed that local tax policies and land policies would affect the location decisions of logistics enterprises. The authors suggest that local governments should consider its impact on the supply chain when formulating policies. Overall, changes in tax burden, solvency, profitability, operating capacity, and growth capacity are important indicators to evaluate the financial health and operational efficiency of China international logistics companies. Existing research shows that these indicators are interrelated and affect the overall performance and market competitiveness of companies.

## RESEARCH METHODOLOGY

### Sample and Research Design

This study selected 28 Chinese international logistics companies from the year 2020 to 2022 to conduct a factor analysis on the interrelationship between five financial and tax indicators (which are tax burden changes, solvency, profitability, operating ability, and growing ability). This paper utilizes the CSMAR database for the

sample of logistics companies. CSMAR is a renowned and widely used database for companies in China. The information is selected from the website under the respective selection of "Eastern Wealth Network - Data Center - Market Center - Logistics Company". First, this paper removes the ST, ST beginning companies, and companies that suffer loss. "ST" or "\*ST" prefix company refers to companies that have financial problems and do not meet relevant regulatory requirements. This study chooses a relatively normal business. Secondly, this study removes companies that are involved in domestic logistics and only includes companies that belong to the international logistics company. This paper also excludes companies with incomplete data to provide consistency in drawing out the conclusion. Hence, only companies with complete financial statements for the years 2020 to 2022 are selected. Final screening resulted in 28 companies being selected as research samples, as shown in Table 1. The year 2020 to 2022 is selected for the completeness of data, considering that the data for 2023 is incomplete while the data for 2024 was not released at the time of the study and that the fluctuation of the overall data before the year 2020 is insignificant. SPSS25.0 statistical tool is used for factor analysis, and the correlation between the five indicators is measured to compare the financial performance of China's international logistics companies by each indicator.

Factor analysis is a powerful statistical method used to simplify and analyze high-dimensional data. The basic idea is to group variables according to the correlation between them, so that the variables in the same group have a high correlation, while the correlation between variables in different groups is low. Each set of variables represents a basic construct, called the common factor. These common factors are latent factors hidden in the observed variables and can explain the correlation between the observed variables. Factor analysis is a method that uses a small number of factors to represent the relationships among many indicators or factors, grouping several closely related variables into one category so that each category of variables becomes a factor. By doing so, it is possible to reflect most of the information in the original data using fewer factors (Han Ying, 2022). In factor analysis, the need to propose hypotheses depends on the purpose of the study. If the research purpose is to test specific theoretical hypotheses, hypotheses need to be proposed. If the research method is a non-hypothesis testing method, the hypothesis can be omitted. The non-hypothesis testing method means that the data are not explained by testing hypotheses but are analyzed descriptively or exploratively. Commonly used non-hypothesis testing methods include factor analysis, cluster analysis, and multidimensional scaling analysis, to name a few. In these methods, the researcher usually does not need to propose research hypotheses but directly analyzes the data to discover the underlying patterns or structure of the data (Tabachnick & Fidell, 2019; Everitt et. al., 2011; Borg & Groenen, 2005). This paper is a non-hypothetical testing method in the factor analysis statistical method. It uses factor analysis to conduct a descriptive analysis of the financial data indicators of international logistics companies to explore the connection between these indicators and tax risk. Therefore, this paper does not involve the hypothesis content.

Table 1. Final sample of international logistics companies in China

Symbol	Name	Symbol	Name
2183	Eternal Asia	601298	Qingdao Port
2800	Tianshun Holdings	601326	Qingdao Port
2930	Hongchuang Wisdom	601598	Zhongguo Youyun
300013	Xinning Logistics	601880	Liaoning Port
300350	Huapeng Flying	601919	Zhongyuan Hai Kong
300486	Dongjie Intelligent	603128	Huamao Logistics

300532	Today International	603223	HengTong Holdings
600018	Shanggang Group	603329	Shanghai Yashe
600233	Yuantong Express	603535	Jiacheng International
600278	Dongfang Chuangye	603569	Changju Materials
600708	Guangming Property	603713	Milck Guard
601000	Tangshan Port	603813	Yuan Shang Holdings
601018	Ningbo Port	603871	Jia You International
601228	Guangzhou Port	603967	Zhongchuang Logistics

### Measurement of Indicators

The study measured five indicators which are changes in tax burden, solvency, profitability, operating ability, and growing ability. Firstly, tax burden refers to the total amount of taxes that companies are required to pay to the government. It is often expressed as a percentage of income or as a ratio of taxes paid to total economic output. The concept encompasses various forms of taxation, including income tax, corporate tax, sales tax, and property tax. This study measures tax burden as a Value-Added Tax (VAT) tax burden differential rate, which is calculated by VAT actually paid divided by sales revenue minus the standard VAT rate. This study also extends the measurement of tax burden as income tax differential rate, which is calculated by income tax divided by pre-tax profit actually paid minus applicable corporate income tax rate.

Secondly, profitability measures a company's ability to generate income relative to its revenue, assets, or equity. Common profitability metrics include the profit margin, return on assets (ROA), and return on equity (ROE). Profitability is a crucial indicator of business performance and sustainability. This study uses ROE and gross profit ratio as the measurements for profitability. ROE is calculated by net profit divided by shareholders' equity while gross profit ratio is calculated by gross profit divided by sales revenue. Thirdly, solvency refers to a company's ability to meet its long-term financial obligations. It is a measure of financial health that indicates whether a company can continue to operate in the foreseeable future without the risk of bankruptcy. Solvency is typically assessed using ratios such as the debt-to-equity ratio and the interest coverage ratio. This study measures solvency by Asset-Liability ratio (denoted by Lev), which is calculated by total liabilities divided by total assets. The solvency is also measured using liquid ratio, which is calculated by current assets divided by current liabilities.

Fourthly, operating ability refers to a company's efficiency in managing its core business operations. This includes the ability to convert inputs into outputs effectively while minimizing costs. Key performance indicators for operating ability include inventory turnover, accounts receivable turnover, and operating margin. This study measures operating ability by total asset turnover (TATO) and cash liquid. TATO is calculated by operating income divided by total assets whereas cash liquid is calculated by net cash flows from operating activities divided by total assets. Lastly, growing ability refers to a company's capacity to expand its operations and increase its market share over time. This can involve scaling up production, entering new markets, or diversifying product offerings. This study measures growing ability by total revenue growth rate, calculated by the current year's operating income minus the previous year's operating income divided by the previous year's operating income. The measurements of the five indicators provide the basis for analyzing the financial performance that can assist stakeholders in understanding and evaluating the financial health of companies. A

summary of the measurements for each indicator is provided in Table 2. As can be seen from Table 2, the direction for the indicator is the expectation of the outcome. The positive direction indicates that the larger the better. When the index value is larger, the tax risk of the company is smaller. The negative direction indicates that the lower the better. When the contrarian indicator is smaller, the tax risk is smaller. Among all nine measurements used for the five selected indicators in this paper, there are three measurements with negative directions.

Table 2. Measurement of Indicators

Indicator	Measurement	Equation	Direction
Changes in tax burden	VAT tax burden differential rate	$(\text{VAT actually paid}/\text{sales revenue}) - (\text{Standard VAT rate})$	Negative
	Income tax differential rate	$(\text{Income tax}/\text{pre-tax profit actually paid}) - (\text{applicable corporate income tax rate})$	Negative
Profitability	Return on equity (ROE)	$(\text{Net profit}/\text{shareholders' equity}) \times 100\%$	Positive
	Gross profit ratio	$(\text{Gross profit}/\text{sales revenue}) \times 100\%$	Positive
Solvency	Asset-liability ratio (Lev)	$(\text{Total liabilities}/\text{total assets}) \times 100\%$	Negative
	Liquid ratio	$\text{Current assets}/\text{current liabilities}$	Positive
Operating ability	Total asset turnover (TATO)	$\text{Operating income}/\text{total assets}$	Positive
	Cash liquid	$\text{Net cash flows from operating activities}/\text{total assets}$	Positive
Growing ability	Total revenue growth rate	$(\text{Current operating income} - \text{previous operating income})/\text{previous operating income}$	Positive

## RESULTS

### Feasibility Test

Correlation analysis of standardized variable indicators, the Pearson correlation coefficients are shown in Table 3. Conventional KMO test and Bartlett's sphericity test are used to determine the correlation of sample data, with results shown in Table 4. The results show that KMO is 0.511, which is more than 0.5 analysis of sample data. The Bartlett's sphericity test result shows Sig is 0, indicating significant correlations among variables. Based on the KMO test and Bartlett's sphericity test on sample data, it can be reasonably concluded that the nine measurements used for the five indicators in this study can be used for factor analysis.

Table 3. Correlation Analysis

	Zscore (Lev)	Zscore (ROA)	Zscore (Net Profit)	Zscore (Liquid)	Zscore (Cashflow)
Zscore(Lev)	1.000	-0.363	-0.385	-0.449	-0.051
Zscore(ROA)	-0.363	1.000	0.771	0.235	0.432



Zscore(NetProfit)	-0.385	0.771	1.000	0.160	0.274
Zscore(Liquid)	-0.449	0.235	0.160	1.000	-0.124
Zscore(Cashflow)	-0.051	0.432	0.274	-0.124	1.000
Zscore(Growth)	0.145	0.283	0.109	-0.146	-0.002
Zscore(ATO)	-0.036	0.143	-0.290	0.102	-0.004
Zscore(IncomeTax)	0.122	0.482	0.212	-0.048	0.684
Zscore(VAT)	-0.032	0.214	0.114	0.068	0.249
	Zscore (Growth)	Zscore (TATO)	Zscore (Income Tax)	Zscore (VAT)	
Zscore(Growth)	1.000				
Zscore(ATO)	0.296	1.000	0.067	-0.045	
Zscore(IncomeTax)	0.244	0.067	1.000	0.433	
Zscore(VAT)	0.046	-0.045	0.433	1.000	

Table 4. KMO and Bartlett Analysis

KMO test value		0.511
Bartlett test of sphericity	Chi2	295.708
	Degrees of freedom	36
	P-value	0.000

**Extraction of Common Factor Variance**

Common factor variance measures the extent to which the extracted common factors can represent the original data information in each variable. When the extraction value is high, it indicates that the common factors more fully and accurately represent the original data information. Generally, a value of 0.5 is considered a threshold for effective representation. As shown in Table 5, the extraction value for Net Profit is as high as 0.917, while the extraction values for ROA and TATO also reach 0.899 and 0.839 respectively, significantly exceeding the threshold of 0.5. Although there are variations in the extraction values and representation levels of other indicators, their extraction values all remain above 0.5, indicating high representation levels, making them suitable for further factor analysis.

Table 5. Communality

	Initial	Extraction
Zscore(Lev)	1.000	0.711

Zscore(ROA)	1.000	0.899
Zscore(NetProfit)	1.000	0.917
Zscore(Liquid)	1.000	0.730
Zscore(Cashflow)	1.000	0.678
Zscore(Growth)	1.000	0.769
Zscore(TATO)	1.000	0.839
Zscore(IncomeTax)	1.000	0.838
Zscore(VAT)	1.000	0.561

### Identify Common Factors

Selecting common factors, one usually tends to choose components with eigenvalues greater than 1 and ensure these factors cover as much original information as possible. Based on the summary of the eigenvalues in Table 6 below, each nine measurements selected for the five indicators are named as components 1 to 9 respectively. The variance explanation rates of components 1, 2, 3, and 4 are 30.470%, 19.879%, 14.942%, and 11.832% respectively, with a cumulative variance explanation rate of 77.124% for the four components. This means that the first four common factors already reflect about 77.124% of the information from the original nine measurements used for the five selected indicators, showing a high level of information coverage and representativeness just by the four components. Therefore, this study has reasonably and representatively selected components 1, 2, 3, and 4 as representatives of the original variables, further naming them F1, F2, F3, and F4 respectively.

Table 6. Total Variance Explained

Component	Initial Eigenvalue			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	Variance Percentage	Cumulative%	Total	Variance Percentage	Cumulative %	Total
1	2.742	30.470	30.470	2.742	30.470	30.470	1.985
2	1.789	19.879	50.349	1.789	19.879	50.349	1.939
3	1.345	14.942	65.292	1.345	14.942	65.292	1.605
4	1.065	11.832	77.124	1.065	11.832	77.124	1.413
5	0.811	9.009	86.133				
6	0.547	6.074	92.207				

7	0.398	4.423	96.630				
8	0.213	2.366	98.995				
9	0.090	1.005	100.000				

To further confirm the reliability of selecting common factors, one can use a scree plot to observe and analyze the factor extraction situation. As shown in Figure 1, the component numbers on the horizontal axis denote different factors, while the vertical axis intuitively reflects the magnitude of each factor's eigenvalue. It can be observed that the steepness of the slope is directly related to the magnitude of the eigenvalue, also indicating the importance of the factor. The steepness corresponding to the first four factors is significantly steeper, indicating larger eigenvalues and higher importance for these factors. In contrast, the slopes of the latter four factors are more gradual, suggesting lower eigenvalues and importance. Thus, extracting common factors F1, F2, F3, and F4 as representatives for subsequent analysis is a reasonable and representative choice.

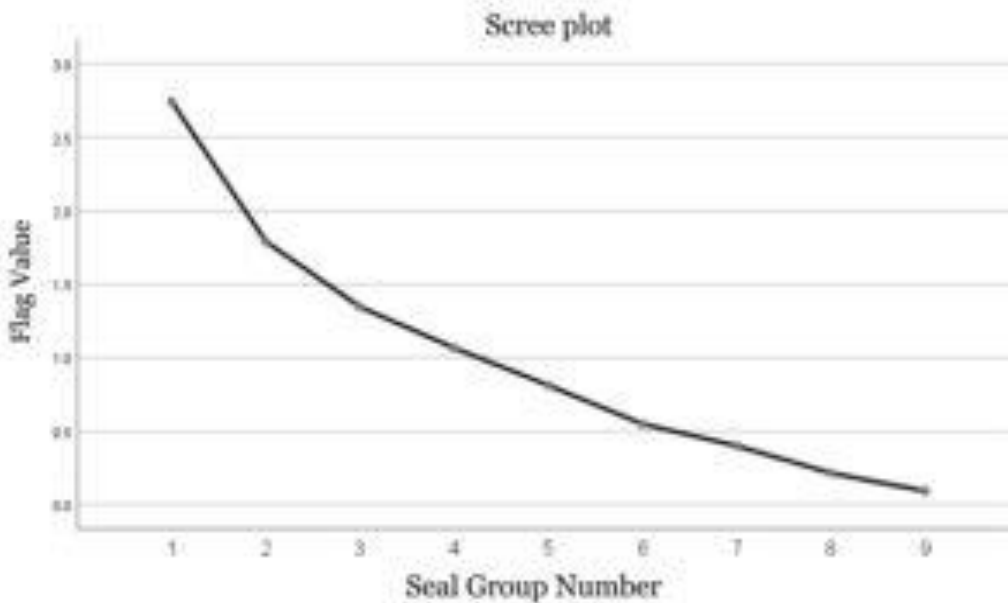


Figure 1. Gravel Chart

**Factor interpretation**

In the process of constructing a factor analysis model to identify common factors, this study is particularly concerned with how to interpret the practical meaning of each common factor reasonably. By renaming the four common factors, this study can ensure that they accurately represent the information of most variables and use this as a basis for in-depth analysis of real-world problems. To highlight the typical representative variables of each common factor, this study used the maximum variance orthogonal rotation method to separate the factor loading square values in the factor loading matrix towards the two extreme directions of 0 and 1 as much as possible. Subsequently, this study looked for variables under each common factor with factor loading coefficients close to 1 in absolute value. These variables have the highest correlation with the common factors, so their information can be represented by the corresponding common factors. Based on the common characteristics of these variables, this study accepted the common factor. The factor loading matrix after orthogonal rotation is shown in Table 7. By searching for variables with coefficient absolute values close to 1, this study named each common factor based on their common characteristics. The common factor F1 has a higher load on VAT, income tax burden (Income Tax), and cash flow, all of which are related to the corporate tax burden. Therefore, this study named F1 as the tax burden variation factor.

Table 7. Rotated Component Matrix

	Component			
	F1	F2	F3	F4
Zscore X1 (Lev)	0.072	-0.367	-0.752	0.071
Zscore X2 (ROA)	0.363	0.797	0.249	0.264
Zscore X3 (NetProfit)	0.107	0.924	0.156	-0.164
Zscore X4 (Liquid)	-0.001	0.033	0.852	0.050
Zscore X5 (Cashflow)	0.762	0.285	-0.116	-0.045
Zscore X6 (Growth)	-0.017	0.334	-0.334	0.739
Zscore X7 (TATO)	0.050	-0.250	0.229	0.849
Zscore X8 (IncomeTax)	0.851	0.226	-0.162	0.190
Zscore X9 (VAT)	0.727	-0.080	0.152	-0.055

**Establishment of factor model**

Building the factor analysis model focuses on evaluating the relative positions of each sample in the overall model. Therefore, this study used the weighted least squares method to accurately calculate the factor scores of the four common factors (F1, F2, F3, F4). The specific calculation results have been presented in Table 7, which intuitively show the position of each sample in the factor space formed by F1, F2, F3, and F4. Furthermore, by observing the component score coefficient matrix in Table 8, it can gain a deeper understanding of the relationship between these four factors and the nine measurements of the indicators, thereby further validating and explaining the effectiveness of the model.

$$F1=0.072*X1+0.363*X2+0.107*X3+-0.001*X4+0.762*X5-0.017*X6+0.050*X7+0.851*X8+0.727*X9;$$

$$F2=-0.367*X1+0.797*X2+0.924*X3+0.033*X4+0.285*X5+0.334*X6+-0.250*X7+0.226*X8-0.080*X9;$$

$$F3=-0.752*X1+0.249*X2+0.156*X3+0.852*X4-0.116*X5-0.334*X6+0.229*X7-0.162*X8+0.152*X9;$$

$$F4=0.071*X1+0.264*X2-0.164*X3+0.050*X4-0.045*X5+0.739*X6+0.849*X7+0.190*X8-0.055*X9;$$

Finally, the rotated variances corresponding to each factor are used as weights for a weighted average calculation, resulting in a comprehensive scoring model for each sample company:

$$W1=30.470%/77.124%=39.508%$$

$$W2=19.879%/77.124%=25.775%$$

$$W3=14.942%/77.124%=19.374%$$

$$W4=11.832\%/77.124\%=15.342\%$$

Therefore, the comprehensive scoring model for each sample company is:

$$F=39.508\% * F1+25.775\% * F2+19.374\% * F3+15.342\% * F4$$

Table 8. Matrix of Component Score Coefficients

	Component			
	F1	F2	F3	F4
Zscore X1 (Lev)	0.067	-0.126	-0.434	0.033
Zscore X2 (ROA)	0.037	0.375	0.069	0.157
Zscore X3 (NetProfit)	-0.121	0.537	-0.044	-0.140
Zscore X4 (Liquid)	0.048	-0.119	0.564	0.060
Zscore X5 (Cashflow)	0.381	0.030	-0.072	-0.091
Zscore X6 (Growth)	-0.155	0.253	-0.257	0.516
Zscore X7 (TATO)	0.046	-0.224	0.221	0.620
Zscore X8 (IncomeTax)	0.428	-0.025	-0.080	0.072
Zscore X9 (VAT)	0.461	-0.236	0.164	-0.081

## DISCUSSION

### Final Factor Scores

Based on the comprehensive score model of the sample companies, the size and ranking of tax risks of the selected 28 listed sample companies can be calculated, and the results as shown in Table 9 below.

Table 9. Result of Factor Score and Ranking

Name	F	Rank	Name	F	Rank
Shanggang Group	1.78324	1	Shanghai Yashe	0.00938	15
Zhongyuan Hai Kong	1.63664	2	Milck Guard	-0.00125	16
Qingdao Port	1.12202	3	Jiacheng International	-0.07126	17
Tangshan Port	0.98321	4	Huamao Logistics	-0.29732	18
Jia You International	0.76841	5	Changju Materials	-0.49028	19

Qinhuangdao Port	0.683316	Tianshun Holdings	-0.5597420
Ningbo Port	0.658697	Zhongchuang Logistics	-0.6147121
Hongchuang Wisdom	0.544468	Dongjie Intelligent	-0.7019222
Liaoning Port	0.305299	Xinning Logistics	-0.8468423
Today International	0.3035310	Eternal Asia	-0.9002724
Yuantong Express	0.300111	Guangming Property	-0.9198625
Guangzhou Port	0.1179812	Zhongguo Youyun	-1.388726
Dongfang Chuangye	0.0782213	Huapeng Flying	-1.429727
Yuan Shang Holdings	0.040214	HengTong Holding	-1.5485128

As shown Table 9 above, through the factor analysis of the data of 28 listed sample companies in the international logistics company from 2020 to 2022, the factor scores of each company are calculated and ranked according to the scores. Higher-ranked companies face relatively little tax risk, while lower-ranked companies face relatively high tax risk. From the distribution of factor scores, when the factor score is greater than 0, it means that the company's tax risk is lower than the company average level, and the risk is relatively small. On the contrary, a score of less than 0 indicates that the tax risk is higher than the company average, and the risk is relatively large. Although there may be inconsistency between the actual tax risk of sample companies and the score ranking in the actual situation, the result of factor analysis still has a certain credibility from the perspective of the company as a whole.

In the sample, there are 15 companies with a score greater than 0 and 13 companies with a score less than 0. Seven companies scored more than 0.6 points and eight companies scored less than -0.6 points. Companies with a score above 0.6 are considered to have a very low tax risk, while those with a score below -0.6 may face an extremely high tax risk. To some extent, this shows that the overall tax risk situation of the international logistics company is not optimistic, many companies are facing greater tax risks, and it is necessary to further strengthen tax risk prevention and control measures.

The above ranking of the top and bottom of the specific companies. Through the above table and formula, the first common factor F1 is mainly reflected by Net Profit, Total Asset Turnover (TATO), and Income Tax. For the convenience of the research, it is named the growth ability factor according to the characteristics of the index. The second common factor F2, which is mainly reflected by cash flow and Growth, is named solvency factor. The third common factor F3 is mainly reflected by Lev and Liquid, named profitability and VAT tax burden change factor. The fourth common factor F4 is mainly reflected by ROA, which is named as the income tax burden change factor. Based on the result, Shanggang Group, Zhongyuan Hai Kong and Qingdao Port, whose scores are higher than 1.0, rank among the top 3. Among the common factors, F1, F2 and F3 are more expressive. From the perspective of a comprehensive scoring model, common factors F1, F2 and F3 are the most important evaluation reference factors. From the point of view of enterprises with scores less than -1.0 and ranking the last three, according to their four common factor scores, they are Zhongguo Youyun, Huapeng Flying and HengTong Holding. F1 and F2 common factors have strong expression, which is also the main factor that makes the factor score low. The two common factors F1 and F2 represent profitability, solvency, and the change of VAT tax burden. These findings suggest that by improving the profitability and solvency of international logistics

companies and reducing the fluctuation of the VAT tax burden, the tax risks of companies can be reduced to a certain extent.

Through factor analysis, it can be seen that strengthening the tax-related risk control of major taxes and reducing the VAT tax burden are conducive to reducing tax risks. For example, for the VAT with the greatest probability of tax risk, international logistics companies should take effective and efficient initiatives of VAT tax declaration while seeking a low tax burden. This can be done in several ways. First, the companies should calculate the project amount according to the different invoice nature and different tax calculation methods and strictly do the deduction and calculation of the output and input tax. Second, it is necessary to strengthen the control of invoices, try to cooperate with companies with good tax credits and can issue special VAT invoices, actively strive for deductible input tax through legal channels to increase the deductible input tax, and do a good job of the companies' invoice filing and storage to ensure the correct issuance and use of invoices. Third, with the full implementation of electronic invoicing, duplicate billing of invoice amounts should be avoided as much as possible to prevent repeated deductions before tax. Fourth, companies should regularly do a good job of value-added tax risk self-examination of logistics business and timely prevent tax risk points.

Regarding the prevention and control of tax risks of the company income tax, international logistics companies should first make corresponding tax planning adjustments and set up monitoring indicators for tax adjustment. Secondly, it is important to continue to follow up on the changes in domestic and international tax policies related to the international logistics industry, establish a reasonable pricing mechanism for related party transactions, and try to ensure that the income tax of domestic and international businesses can be correctly handled to reduce tax disputes. The third is to ensure as far as possible, that the income of domestic companies before tax declaration can be timely and accurately recognized, the scope of deduction of logistics business expenses is real and reasonable, the asset depreciation of logistics-related means of transport and other fixed assets related to production and operation is in line with the regulations, and the tax incentives of international logistics business and domestic logistics business are fully utilized to make reasonable tax planning. The fourth is to grasp the tax differences, do a good job in the adjustment of tax deduction items and the accuracy of tax and accounting, and prevent corporate income tax risks from the source of tax matters. The changes are identified through the emphasis on tax practices such as asset depreciation, specific logistics-related deductions, and the use of tax incentives.

In addition, international logistics companies should pay more attention to the tax treatment of additional taxes, real estate taxes, urban land use taxes, customs duties, stamp duty and other taxes. On the one hand, to grasp the use of preferential tax policies, on the other hand, to do a good job of accurate calculation of taxes and timely declaration and payment, strengthen the daily management of tax-related matters, to avoid the occurrence of back-payment, late fees, fines and other situations. From the results of factor analysis, financial indicators such as profitability, solvency and growth ability are all important factors affecting the tax risk of enterprises. Therefore, enterprises should strengthen the prevention and control of tax risks. In addition to being alert to external factors that are difficult to control such as policy changes, economic cycles, and business environment, they still need to further prevent and control tax risks internally.

## CONCLUSION

The study reveals that China's international logistics companies face significant challenges in managing tax burdens, solvency, operational efficiency, and growth capacity. Effective tax planning, optimizing debt structures, and enhancing operational capacity are crucial for improving competitiveness and ensuring long-term sustainability. These findings underscore the importance of strategic financial management in navigating a dynamic global logistics landscape and highlight opportunities for growth through targeted improvements in financial and operational practices. This paper had four key findings. In the aspect of tax management, an

effective tax strategy is essential to improve profitability and mitigate the risks associated with tax burden. Companies should constantly adjust their tax planning to adapt to changing policies. In another aspect of financial health, maintaining strong solvency is key to obtaining favorable financing and ensuring long-term operational stability. Logistics companies must give priority to financial management practices that improve the solvency ratio. Thirdly, in terms of operational efficiency, investing in operational capabilities can significantly improve customer satisfaction and overall financial performance. Companies should adopt lean management principles to optimize their operations. Finally, in terms of strategic growth, achieving sustainable growth requires a balance between resource management and market participation. Logistics companies must remain agile and responsive to market trends to effectively capitalize on growth opportunities.

The significance of this study is mainly divided into three aspects. First, to reveal the drivers of financial performance, this study delves into the complex factors that affect the tax risk of China international logistics companies, revealing the underlying mechanisms that affect their tax burden, solvency, profitability, operational ability, and growth ability. By identifying and analyzing these key drivers, the study provides valuable insights for companies to understand and address the factors affecting their financial health and sustainability. Second, this study provides a comprehensive understanding of the determinants of tax risk. China international logistics companies can combine the specific characteristics of the company, company background, and financial advantages and disadvantages, to customize the financial strategic plan. By effectively managing tax obligations, optimizing debt structures, improving operational efficiency, and pursuing strategic growth opportunities, companies can improve their competitiveness in the dynamic global logistics landscape. Thirdly, this study contributes to further research in the field of financial performance analysis of China's international logistics company. By identifying areas of the international logistics company for investigation, the study encourages researchers to explore in the company, delve into company-specific case studies, and refine methods for continuous improvement of tax risk practices.

The interplay between tax burden, solvency, profitability, operating capacity, and growth capacity highlights the complexity of managing the financial performance of China's international logistics company. By effectively managing tax obligations, optimizing debt structures, improving operational efficiency and pursuing strategic growth opportunities, companies can increase competitiveness and ensure long-term sustainability in a dynamic global logistics landscape. This study lays the foundation for logistics companies to address the challenges and opportunities within the company, such as significant challenges in managing tax, solvency, and operational efficiency, whereas clear opportunities in optimizing tax strategies, restructuring debt, improving operational processes, and pursuing strategic growth opportunities, that ultimately contribute to the resilience and growth of the company. Future research should explore the long-term impact of tax policy changes on tax risk and provide targeted recommendations for optimizing company tax strategies. By addressing these gaps, scholars can gain a deeper understanding of the financial situation of China's international logistics companies and provide a reference for policy-making on sustainable development. This comprehensive analysis lays the foundation for logistics companies to improve their financial performance and competitiveness in the global market, ultimately contributing to the resilience and growth of the company.

## REFERENCES

1. Borg, I., & Groenen, P. J. F. (2005). *Modern multidimensional scaling: Theory and applications* (2nd ed.). Springer.
2. Brigham, E. F., & Ehrhardt, M. C. (2016). *Financial Management: Theory & Practice*. Cengage Learning.
3. Chang, C. H., Lu, C. S., & Lai, P. L. (2022). Examining the drivers of competitive advantage of the international logistics industry. *International Journal of Logistics Research and Applications*, 25(12), 1523–1541.



4. China Federation of Logistics and Purchasing. (2022). China Logistics Industry Development Report 2022. Beijing: China Federation of Logistics and Purchasing.
5. Chen, M., Noga, T., & Yi, J. (2022). The impact of leverage on firm tax avoidance and risk taking. *Journal of Corporate Finance*, 70, 102076.
6. Celikay, F. (2020). Dimensions of tax burden: a review on OECD countries. *Journal of Economics, Finance and Administrative Science*, 25(49), 27-43.
7. Chang, Y., & Zhang, J. (2021). The effect of corporate income tax on profitability: Evidence from Chinese listed companies. *Journal of Business Research*, 124, 123-130. <https://doi.org/10.1016/j.jbusres.2020.11.025>
8. Deloitte. (2022). China's logistics industry: Trends and challenges. Retrieved from [https://www2.deloitte.com/content/dam/Deloitte/gr/Documents/energy-resources/gr\\_chinesetaxlaw\\_no\\_exp.pdf](https://www2.deloitte.com/content/dam/Deloitte/gr/Documents/energy-resources/gr_chinesetaxlaw_no_exp.pdf)
9. Dong-mei, W., Cai-rong, Z., & Hejie, S. (2014). The optimal taxation of logistics industry in China. *Journal of Industrial Engineering and Management*, 7, 461-474.
10. Eberhartinger E, Zieser M. The Effects of Cooperative Compliance on Firms' Risk, Tax Risk Management and Compliance Costs[J]. *Schmalenbach Journal of Business Research*, 2021, 73(1): 125 -178.
11. Everitt, B. S., Landau, S., Leese, M., & Stahl, D. (2011). *Cluster analysis* (5th ed.). Wiley.
12. Fang Haishan et al., "Research on the Relationship between Value-added Tax and Enterprise Income Tax Reform", *Tax Law Review*, No. 1, 2016.
13. Fu et al. (2012), Research on Corporate Tax risk management based on risk identification, *Enterprise Research Management*, no. 4.
14. Gui-lan, H. (2013). On the Phenomenon of Tax Burden Increase of Logistics Industry in Extending Value Added Tax base Reform. *China Business and Market*.
15. Guo yan tong. (2022). Analysis of tax risk management and preventive measures for logistics enterprises in the new era. *China Logistics & Purchasing* (04),117.
16. Han Ying. (2022). On the Financial Performance Evaluation of Listed Companies in Chinese Logistics Industry Based on Factor Analysis. *Logistics Technology*. 2022, 45(10): 165-169
17. Huang Changhai (2013). International Jifeng's "carbon neutrality" drives the green process.
18. Jung, K., & Kim, B. (2008). Corporate Cash Holdings and Tax-induced Debt Financing. *Asia-pacific Journal of Financial Studies*, 37, 983-1023.
19. KPMG. (2023). China's logistics sector outlook: Trends and forecasts. Retrieved from <https://home.kpmg/xx/en/home/insights/2023/01/china-logistics-sector-outlook.html>
20. Kwak, Dong-Wook. (2014). Risk management in international container logistics operations: risk analysis and mitigating strategies. PhD Thesis, Cardiff University.
21. Li, W., Zhang, X., & Wang, Y. (2016). Research on tax cost and economic benefit of transportation enterprises. *Transport Economics and Technology*, 12(3), 45-50.
22. Li Dong, Zhang Wei (2018). Analysis of determinants of solvency of international logistics enterprises. *Management and Economics*, 23(1), 45-47.
23. Lu et al. (2015), Research on corporate tax risk prevention and control based on risk response, *Business Management*, no. 1.
24. Luo Yanan, (2022). Research on tax risk of China's traditional Chinese medicine industry. Master Thesis, Inner Mongolia University of Finance and Economics.
25. Ma et al. (2020). Research on risk management strategy of infrastructure projects Based on risk importance ranking. *China Engineering Safety Supervision and Administration*, 31(06):9-13.
26. Penman, S. H. (2013). *Financial Statement Analysis and Security Valuation*. McGraw-Hill.
27. Penrose, E. T. (1959). *The Theory of the Growth of the Firm*. Wiley.
28. Qi Yudong (2016). The breakthrough of state-owned enterprises under the supply-side reform - the

- supply-side reform refers to the "state-owned enterprise disease".
29. Qing-song, L. (2013). Discussion on the Present Situation and the Tax Reform of China's Logistics Industry. *Logistics Engineering and Management*.
  30. Şteţ, M. (2012). Tax and Accounting Issues in Supply Chain. *Ovidius University Annals: Economic Sciences Series*, 1707-1711.
  31. Slack, N., Chambers, S., & Johnston, R. (2010). *Operations Management*. Pearson Education.
  32. Shaojuan Ouyang, Ying Fang Enterprise (2022). Financial and Tax Risk Management Methods under the Background of Big Data. *Mathematical Problems in Engineering*.
  33. Sun Yu. (2017). The Research on Tax Risk Control of "One Belt, One Road" Logistics Industry. Master's Thesis, Beijing Jiaotong University.
  34. Sun Shuxian. (2021). Research on Tax Risk Management of Pharmaceutical Manufacturing Industry. Master Thesis, Inner Mongolia University of Finance and Economics.
  35. Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.
  36. United Nations Conference on Trade and Development (UNCTAD). (2021). Economic development in Africa report 2021: Reaping the benefits of the African Continental Free Trade Area (SER-RP-2021D16). [https://unctad.org/system/files/official-document/ser-rp-2021d16\\_en.pdf](https://unctad.org/system/files/official-document/ser-rp-2021d16_en.pdf)
  37. Wang et al. (2013), Research on Corporate Tax Risk management based on risk Assessment, *Enterprise Observation*, no. 18.
  38. Wang, L. (2022). Financial analysis of China's international logistics companies. *International Journal of Logistics and Supply Chain Management*, 10(2), 55-72.
  39. Wang et al. (2017). Supply Chain Risk Assessment Method Based on systemic risk Theory and chain rules. *Journal of Management Modernization*, 39(04):80-83.
  40. Xue weiwe. (2013). Discussion on the impact of business tax reform to value-added tax on international logistics companies. *Foreign Investment in China*. (01),197+199. doi: CNKI: SUN: WQZG.0.2013-01-150.
  41. Xi guangxu. (2020). Financial Performance Evaluation of IFLYTEK Based on Factor Analysis (Master's Thesis, Xinjiang University of Finance and Economics).
  42. Yong Liu, Yumin Li, Xianshun Wang. (2017). Research on the Impact of Tax Reform on the Tax Burden of Logistics Enterprises. 2017 3rd International Conference on Innovation Development of E-commerce and Logistics (ICIDEL 2017).
  43. Yang, Xiaohong, Lu, Dawei (2015). Research on influencing factors of profitability of international logistics enterprises. *Financial Research*, 2015(12), 45-49.
  44. Zhang W. (2022). Profitability Analysis of Chinese international logistics enterprises. *Logistics Technology*, 10(2), 30-45.
  45. Zeng et al. (2019). Research on Enterprise Operational risk Assessment based on risk factor modeling. *Journal of Shanghai University of Finance and Economics*, 27(04):80-86.