

Sources and Control Strategies of Corporate Tax Risks

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Abstract. Against the dual backdrop of economic globalization and the increasing complexity of tax regulations, corporate tax risk has become a key factor affecting enterprises' financial health, reputation, and sustainable development. Traditional tax risk management models rely on manual experience and post-event remedies, which struggle to address challenges arising from frequent policy changes and rapid business development. This paper systematically analyzes the sources of corporate tax risks from three dimensions: internal drivers, external policy environment, and industry characteristics. It constructs a tax risk control framework that integrates dynamic quantification and intelligent decision-making, covering core links such as data collection, indicator system construction, mathematical model application, and risk response strategies. Through scenario-based practical cases—including associated transaction management in the manufacturing industry, compliance management in cross-border e-commerce, and tax optimization in the service industry—the paper verifies the effectiveness of this framework. It provides theoretical support and practical paths for enterprises to enhance tax risk prevention and control capabilities, reduce compliance costs, and achieve the intelligent transformation of tax management.

Keywords: Corporate Tax Risk; Risk Sources; Dynamic Quantification; Intelligent Decision-Making; Control Strategies.

1. Introduction

As China's tax collection and management system transitions to "tax governance based on data" and the Golden Tax Phase IV project advances comprehensively, tax authorities have shifted their supervision of enterprises from "experience-based inspection" to "data-driven penetration". Enterprises now face unprecedented pressure for tax compliance. Tax risks are no longer limited to simple declaration errors but extend to business decisions, strategic planning, and other aspects. Once these risks emerge, they not only force enterprises to pay back taxes, late fees, and fines but also may trigger reputation crises and even affect enterprises' market access and financing capabilities.

Traditional tax risk management models have significant shortcomings. On one hand, they rely on the personal experience of financial personnel and tax specialists. When handling massive business data and complex tax policies, these models easily lead to judgment biases and operational errors, and they fail to identify risks in advance. On the other hand, severe data barriers exist between departments. Financial, business, and tax data are fragmented, resulting in delayed risk early warnings. Enterprises often respond passively only after tax authorities initiate inspections. Against this background, the rise of intelligent technology provides a new solution for corporate tax risk management. Through dynamic quantification technology, enterprises can assess risk levels in real time; with intelligent decision-making systems, they can proactively optimize tax strategies and achieve a management model transformation from "post-event remedy" to "pre-event prevention and in-process control". Based on this practical demand, this paper conducts an in-depth analysis of the multiple sources of corporate tax risks, constructs an integrated framework of dynamic quantification and intelligent decision-making, and verifies its feasibility through practical cases, thereby offering a systematic approach for corporate tax risk management.

2. Practical Dilemmas in Corporate Tax Risk Management

2.1. Limitations of Traditional Management Models

Traditional corporate tax management centers on manual operations, and its limitations manifest in three dimensions. First, data processing capabilities are insufficient. As enterprises expand their business scale, business data grows exponentially. Tax declaration requires the integration of multi-dimensional information such as procurement, sales, and finance. Manual processing not only has low efficiency but also easily leads to inaccurate declarations due to data entry errors, calculation deviations, and other issues. For example, a manufacturing enterprise missed some documents when manually calculating the deducted amount of input invoices during monthly value-added tax declaration, resulting in underpayment of taxes. In the end, tax authorities demanded the enterprise to pay back taxes and additional late fees, causing direct losses exceeding 500,000 yuan[1].

Second, risk identification suffers from lag. Under the traditional model, tax risk assessment mostly relies on quarterly or annual manual reviews, which cannot track business dynamics and policy changes in real time. Risks are often detected only after they have turned into actual losses. Taking tax preferential policies as an example, some enterprises failed to grasp the expiration time of preferential policies in a timely manner and still declared at the original preferential tax rate, leading to overpayment of taxes. They could not recover the losses through subsequent corrected declarations.

Third, inter-departmental collaboration efficiency is low. The financial department takes charge of tax declaration, while the business department handles contract signing and execution. There are time lags and information gaps in data transmission between the two departments. For instance, the business department did not clearly specify the overseas service location and tax exemption clauses in a signed cross-border service contract. The financial department paid value-added tax according to taxable items during declaration. Although it later discovered that it could enjoy the tax exemption policy, it could not apply for a tax refund from tax authorities due to the lack of contract clauses, resulting in unnecessary tax expenditure as show in figure1 .

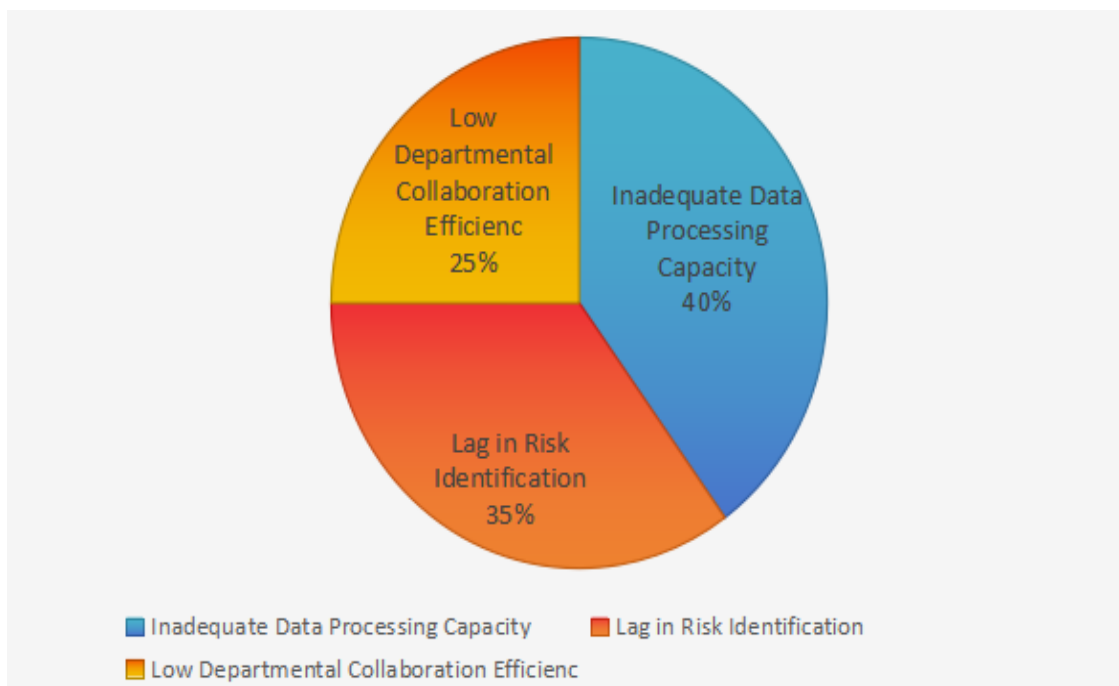


Figure 1. Distribution Chart of Proportion of Core Shortcomings in Business Operations.

2.2. Breakthrough Points Enabled by Intelligent Technology

Intelligent technology effectively compensates for the shortcomings of the traditional model through data integration, model calculation, and real-time monitoring. Its breakthrough points mainly manifest in two aspects. First, it enhances dynamic quantification capabilities. With big data

technology, enterprises can collect internal business data (such as procurement contracts, sales invoices, and expense vouchers) and external data (such as tax policies, industry tax burden rates, and tax inspection cases) in real time. By constructing an indicator system, they can convert abstract tax risks into quantifiable values. For example, an e-commerce enterprise uses big data analysis tools to count indicators such as the "invoice issuance rate" and "declaration difference rate" of each store in real time[2]. When these indicators exceed preset thresholds, the system automatically triggers an early warning, shortening the risk identification time from the traditional monthly cycle to real time.

Second, it strengthens intelligent decision support. Through machine learning and mathematical models, enterprises can automatically generate optimal tax strategies and adjust them dynamically to adapt to policy changes. Taking corporate income tax planning as an example, the intelligent decision-making system can automatically match preferential policies—such as additional deductions for research and development expenses and accelerated depreciation of fixed assets—based on data like enterprises' research and development expenses and fixed asset purchases. It calculates the tax burden and compliance risks of different planning schemes and finally recommends the optimal one. In addition, intelligent technology can also realize cross-departmental data collaboration. By building a tax management platform, it integrates financial, business, and tax data to ensure that tax processing suggestions are generated simultaneously when business occurs, avoiding risks caused by information asymmetry.

3. Multi-Dimensional Analysis of Tax Risk Sources

3.1. Distortion of Financial and Tax Data

The distortion of financial and tax data is the core source of internal tax risks for enterprises, mainly manifested in chaotic invoice management and incorrect financial accounting. In terms of invoice management, some enterprises have problems such as recording false invoices, repeated reimbursements, and inconsistencies between invoices and the actual business situation. For example, a construction enterprise accepted "head-and-tail inconsistent" invoices (where the amount on the invoice copy is greater than that on the accounting copy) provided by suppliers to deduct costs and expenses[3]. Finally, tax authorities discovered this through the comparison of the electronic invoice ledger system. The enterprise faced penalties including repaying corporate income tax, paying fines, and covering late fees, involving an amount exceeding 2 million yuan. According to statistics from Juzhong Chengming Law Network, 3,205 invoice crime cases were filed and investigated nationwide in 2023, an increase of approximately 1.6 times compared with the same period in history. Among these cases, 65 major cases involved the seizure of more than 100,000 counterfeit invoices. Risks caused by improper enterprise invoice management accounted for more than 60% of tax-related cases.

In terms of financial accounting, inaccurate revenue recognition and unreasonable cost and expense allocation are the main problems[4]. In accordance with accounting standards and tax laws, enterprises should recognize revenue in a timely manner when revenue recognition conditions are met. However, some enterprises delay the recognition of sales revenue or advance the recognition of advance receipts to adjust profits, leading to deviations in value-added tax and corporate income tax declarations. In addition, unreasonable cost and expense allocation can also trigger risks. For example, a group enterprise randomly allocated headquarters expenses to its subordinate subsidiaries without following a reasonable proportion. Tax authorities identified this as fabricating costs, and the enterprise had to pay back 1.5 million yuan in corporate income tax. Combined with practical tax risk management data, when the accuracy of enterprise financial data increases from 80% to 95%, the probability of tax risks decreases by 40%. This indicates a significant negative correlation between the accuracy of financial data and tax risks as show in figure2.

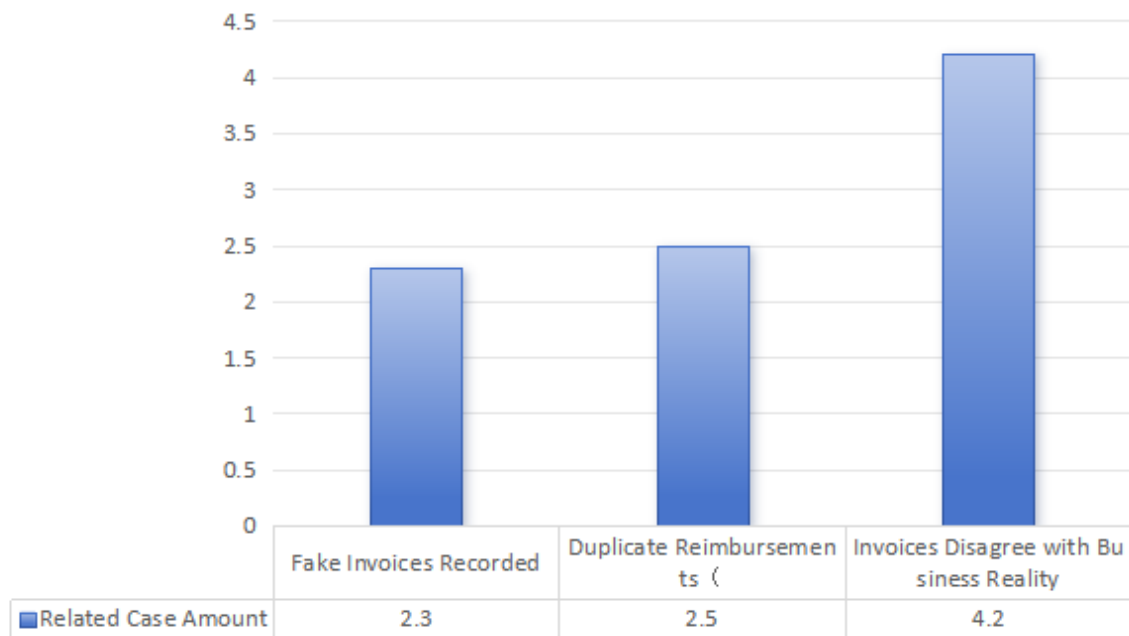


Figure 2. Distribution of Invoice Management Issues & Related Risk Amount.

3.2. Sudden Changes in Tax Policies

Frequent adjustments to tax policies are one of the main external risks faced by enterprises. Policy changes involve tax rate adjustments, cancellation or revision of preferential policies, changes in collection and management requirements, and other aspects, which have a direct impact on corporate tax management. For example, in 2022, preferential policies for small-scale value-added tax taxpayers were adjusted: the policy of reducing the collection rate from 3% to 1% was extended to the end of 2023, and the value-added tax threshold was raised. Some enterprises failed to adjust their invoice issuance systems and declaration processes in a timely manner and still issued invoices at a 3% tax rate, resulting in overpayment of taxes. Other enterprises miscalculated the expiration time of the policy and declared at a 3% tax rate in advance. Although they could apply for a tax refund later, this increased their financial costs and time costs.

From the perspective of policy adjustment frequency, China's tax policies show obvious dynamic characteristics. In 2023 alone, the State Taxation Administration, together with relevant departments, investigated and handled 5,042 cases of illegal acquisition of tax and fee preferences, involving issues related to the application of multiple policies. On average, there are more than 20 adjustments to policies related to major taxes such as value-added tax and corporate income tax every year. Some policies even have the characteristics of "being introduced urgently and taking effect in the short term", leaving enterprises with insufficient adaptation time. In addition, regional differences in policy implementation standards also increase risks. For example, some regions have different calculation standards for "the number of employees" in the "corporate income tax preferences for small and micro enterprises": some calculate it based on the average number of employees per quarter, while others use the annual average number of employees. Enterprises that fail to grasp local implementation standards are prone to declaration errors[5].

4. A Control Framework for Dynamic Quantification and Intelligent Decision-Making

4.1. Indicator Construction Layer

The indicator system serves as the foundation for dynamically quantifying tax risks. It needs to cover three dimensions—compliance, operation, and policy sensitivity—to achieve comprehensive coverage and accurate measurement of tax risks. Compliance indicators assess the compliance level

of enterprise tax declaration and operations. Core indicators include: declaration anomaly rate (the deviation rate between monthly declaration data and historical average), inspection and penalty records (whether there are tax penalties in the past 3 years), and invoice compliance rate (the proportion of compliant invoices to the total number of invoices). The calculation formula for the invoice compliance rate is $(1 - \text{number of non-compliant invoices} / \text{total number of invoices}) \times 100\%$. This indicator directly reflects the standardization of enterprises in links such as invoice acquisition, issuance, and certification. An excessively high proportion of non-compliant invoices will directly lead to risks such as the inability to deduct input tax or the inability to deduct costs and expenses. For example, if an enterprise has a declaration anomaly rate exceeding 10% and an invoice compliance rate lower than 90%, it needs to focus on the risks of declaration accuracy and invoice management.

Operational indicators reflect the impact of enterprise business models on tax risks. They mainly include: associated transaction ratio (the proportion of associated transaction amount to total transaction amount), cross-border revenue ratio (the proportion of cross-border business revenue to operating income), and cost-expense ratio (the proportion of costs and expenses to operating income). Enterprises with an excessively high associated transaction ratio (e.g., exceeding 50%) are prone to the risk of transfer pricing investigations. Enterprises with a high cross-border revenue ratio need to address compliance risks caused by differences in tax systems across countries. Policy sensitivity indicators measure the sensitivity of enterprises to changes in tax policies. They include: tax rate change impact (the impact amount on enterprise tax burden for each 1% change in tax rate) and preference dependence (the proportion of the amount of tax preferences enjoyed to the tax payable). For example, if an enterprise has a preference dependence exceeding 60%, its tax burden will increase significantly when the relevant preferential policies expire or are adjusted, and the enterprise needs to formulate response strategies in advance.

4.2. Application of Mathematical Models

4.2.1. Static Evaluation Model

4.2.1 Application analysis of static assessment model for enterprise tax risk.

Based on historical data of the enterprise, the static assessment model predicts the probability of tax risk occurrence and is suitable for stage risk assessment. The commonly used model is the logistic regression model. This model constructs a logical function to associate multiple influencing factors with the probability of tax risk occurrence. Its core formula is the calculation formula for the probability of tax risk occurrence: $P = \frac{1}{1 + e^{-(\beta_0 + \sum \beta_i x_i)}}$

Where : P represents the probability of tax risk occurrence, and the value range is strictly limited to 0 to 1; β_i is the constant term of the model, and β_i is the coefficient corresponding to each influencing factor, which needs to be trained through historical data; x_i is the standardized value of each influencing factor. Taking the tax risk assessment of a certain enterprise as an example, first determine the data scope and variable settings. Select the monthly data of the enterprise from 2018 to 2022 as the model training set, and set "whether tax risk occurs" as the dependent variable, where the occurrence of risk is recorded as 1 and the non occurrence of risk is recorded as 0; Simultaneously select three key indicators as independent variables: abnormal declaration rate x_1 , invoice compliance rate x_2 , and proportion of related party transactions x_3 . After conducting logistic regression analysis on the above data using SPSS software, the specific coefficients of the model were obtained $\beta_0 = -2.5$, $\beta_1 = 1.8$, $\beta_2 = -1.2$, $\beta_3 = 1.5$. When evaluating the tax risk of the enterprise in January 2023, the standardized values of various indicators for that month should be obtained first: the declaration anomaly rate of 12% corresponds to a standardized value of $x_1 = 1.5$, the invoice compliance rate of 85% corresponds to a standardized value of $x_2 = -0.8$, and the proportion of related party transactions of 45% corresponds to a standardized value of $x_3 = 1.2$. Next, substitute the model for step-by-step calculation. The first step is to calculate the results of the linear combination part, as follows: $\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3$. Finally, the linear combination result is substituted into the risk probability calculation formula, and it is obtained that $P = \frac{1}{1 + e^{-2.96}}$ is approximately equal to 0.95. This means

that the probability of the enterprise experiencing tax risk in January 2023 is 95%, and risk control measures need to be taken immediately. The advantage of static evaluation models lies in their simple calculation and strong interpretability, which can help enterprises quickly identify high-risk periods. However, the limitation is that they cannot capture the impact of policy changes and business dynamics on risks in real time, and need to be used in conjunction with dynamic models.

4.2.2. Dynamic Prediction Model

The dynamic prediction model relies on time-series data to capture the relationship between policy changes and risk evolution in real time. It suits continuous risk monitoring, with the LSTM (Long Short-Term Memory) neural network as the commonly adopted model. By integrating memory cells and a gating mechanism, the LSTM model overcomes the defect of traditional neural networks in handling long-term dependent data and effectively predicts dynamic changes in tax risks.

A group enterprise took its daily data from 2019 to 2023 as the training set and constructed an LSTM model through the TensorFlow framework. It set the number of hidden layer nodes to 64, iteration times to 1000, and learning rate to 0.001. After completing model training, the enterprise applied it to predict tax risks in January 2024. The results showed that on January 10, the risk level rose to Level 4 due to a sharp drop in the authentication amount of input invoices, and the system automatically triggered an early warning.

The enterprise promptly conducted an investigation and identified that the issue stemmed from its subsidiary failing to upload invoice data in a timely manner. After urging the subsidiary to upload the data immediately, the risk level decreased to Level 2 on January 11. Practice demonstrates that this LSTM model achieves a prediction accuracy of 85%, representing a 30% improvement compared with the traditional static model. It effectively realizes real-time monitoring and early warning of tax risks.

5. Conclusion

To prevent tax risks in relevant enterprises, enterprises should integrate static Logistic models and dynamic LSTM networks to conduct full-cycle assessments, strengthen digital supervision of invoices, standardize financial accounting processes, and establish real-time data sharing mechanisms between finance and business departments. In addition, regular policy training and internal audits are also crucial. This multi-level control system can effectively curb the source of risks, improve the level of tax compliance, and ensure the sustainable operation of enterprises.

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