

Analysis on the use of financial engineering to manage enterprise risk

Tianxing Dai

Hainan Vocational University of Science and Technology, Haikou 571126, China

Abstract: This paper deeply explores the use of financial engineering to manage enterprise risk related content. Firstly, the connotation of financial engineering and risk management is expounded comprehensively. Then it elaborates the effectiveness of financial engineering in the control process of price risk, quantity risk, investment risk, merger risk and agency risk. Then it analyzes the challenges faced by the application of financial engineering to manage enterprise risk. Based on the analysis of this paper, the purpose is to provide more references for enterprises to use financial engineering more effectively in risk management.

Keywords: Financial Engineering; Risk Management; Enterprise Risk

Introduction

In today's complex and changing economic environment, enterprises are faced with a variety of risks. As an innovative means of risk management, financial engineering has been paid more and more attention by enterprises. It uses methods such as mathematics, statistics and computer science to design, develop and combine financial instruments to help businesses manage risk more effectively. However, the application of financial engineering in enterprise risk management is not smooth sailing, and there are some problems and challenges. Therefore, it is of great practical significance to study the application of financial engineering to manage enterprise risk.

1. Financial engineering and risk management

Enterprise risks come from a wide range of sources, on the one hand, risks caused by the uncertainty of the external business environment, on the other hand, risks caused by incomplete internal systems or limited ability of management personnel. In order to effectively avoid the negative impact of risk on enterprise operation and development, risk management has been paid attention to. The so-called risk management focuses on scientific sharing and control.

Before the emergence of financial engineering, the risk management methods commonly used by enterprises include asset liability management, insurance and portfolio investment. These three methods are all on-balance sheet control valves, which offset the risks caused by market finance by adjusting the composition of assets and liabilities in the company's underlying business. Based on its application principle, all three methods have their shortcomings. Based on this, with the change of the development trend of economic situation, in order to better solve the adverse effects brought by risk management, financial engineering, a new method to make up for the shortcomings of traditional risk management methods, has been further explored^[1].

Compared with the traditional tripartite risk management method, financial engineering belongs to the off-balance sheet control method, that is, to achieve the goal of avoiding risks with the help of various hedging tools in the financial market. The core of this approach lies in the scientific application of risk management tools and techniques. The so-called financial engineering management method does not involve the items on the balance sheet, nor will it change the balance of the underlying business assets and liabilities. Therefore, its opportunities will not be reflected in the balance sheet, but the market risks scattered in all corners of the social economy can be centrally matched with the trading market, and then divided and packaged and redistributed. Help hedgers avoid most of the risk. Compared with the traditional means, the financial management method has four advantages: high accuracy, strong timeliness, high flexibility and low cost.

2. Application of financial engineering in enterprise risk management

2.1 Control of price risk

Financial engineering Through the use of futures, options and other derivatives, enterprises can hedge raw material price fluctuations,

lock costs, and protect profits. For example, a manufacturing enterprise expects the price of raw materials to rise in the future, it can buy the corresponding futures contract, so that when the price rises, the profit of the futures contract can make up for the increase in the cost of the spot market, and effectively control the price risk.

2.2 Innovation quantity risk control

Financial engineering uses innovative methods to control quantitative risk. For example, the innovation of insurance products is used to guarantee the production quantity of enterprises. When enterprises face the risk of production decline due to natural disasters, technical failures, etc., customized insurance programs can provide certain economic compensation to reduce losses. At the same time, the quantitative model is used to accurately forecast the market demand to help enterprises rationally arrange the production scale and avoid overstocking or insufficient supply.

2.3 Diversify and control investment risks

Financial engineering provides companies with diversified portfolio strategies to diversify and control investment risk. Through the asset allocation model, funds are allocated to different asset classes, such as stocks, bonds, real estate, etc., reducing the impact of single asset fluctuations on the overall portfolio. In addition, the use of risk hedging tools, such as the combination of stock index futures and stock spot, when the market fluctuations, to realize the mutual offset of risks, to ensure the stability and return of investment.

2.4 Defense and control of merger risks

In the process of enterprise merger, financial engineering can help to prevent and control risks. Through the target enterprise value assessment and risk analysis, to formulate a reasonable merger strategy. We will use M&A loans, leveraged buyouts and other financial means to optimize the capital structure and reduce financing costs. At the same time, derivatives are used to hedge the integration risk after the merger to ensure the stable development of the enterprise after the merger.

2.5 Supervise and control agency risks

Financial engineering plays an important role in supervising and controlling agency risk. Through the design of incentive mechanisms, such as stock options, performance rewards, etc., agents' interests are linked to the long-term development of enterprises, so as to reduce agents' behavior of damaging enterprises in pursuit of short-term interests. The risk monitoring model is used to monitor agents' decisions and behaviors in real time, discover potential risks in time, and take corresponding measures to prevent them ^[2].

3. Challenges of using financial engineering to manage enterprise risk

3.1 Failure to fully consider systemic risks

When financial engineering is used to manage enterprise risk, there is a challenge that systemic risk cannot be fully considered. Systemic risk is usually caused by macroeconomic, political and other factors, and its impact is wide and difficult to predict. Financial engineering models are often based on historical data and assumptions, and cannot adequately cover such large and complex systemic shocks. For example, a global financial crisis or major policy adjustment may lead to the overall collapse of the market, at which time the risk management strategy of financial engineering may not be able to effectively deal with, resulting in huge losses for enterprises.

3.2 Excessive reliance on historical data information

Excessive reliance on historical data information is a significant problem in financial engineering when managing enterprise risks. Although historical data can provide a certain reference, the market environment and economic situation are constantly changing, and past patterns and laws may not be able to accurately predict the future. If the risk model and strategy are constructed solely on the basis of historical data, emerging risk factors and changes in market structure may be ignored, leading to deviations in risk assessment and management, and making enterprises unprepared when facing new risks ^[3].

3.3 Low Probability events cause results to become invalid

When financial engineering manages enterprise risk, the occurrence of small probability events may cause the result to be invalid. Although financial engineering models are often based on probability and statistics, extreme, low-probability events, such as loan defaults or financial crises, have huge impacts that are difficult to predict with conventional models. When these small probability events occur, the risk management strategy originally designed based on normal market conditions may completely fail, bring serious unexpected consequences to the enterprise, and even threaten the survival and development of the enterprise.

Conclusion

In summary, through the analysis of the application of financial engineering to manage enterprise risk, the important role of financial engineering in enterprise risk management is recognized, and financial engineering provides enterprises with diversified risk management tools and strategies. But at the same time, when using financial risk to manage enterprise risk, this method also has some limitations, mainly in the failure to fully consider systemic risk, too much reliance on historical data and small probability events will lead to problems. Therefore, according to the actual situation of enterprises, reasonable use of financial engineering and continuous improvement of risk management system are the key to ensure the steady development of enterprises in the market environment full of risks.

References

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