

Research on the Risk Management of Supply Chain Risk, Exchange Rate Risk and Economic Recession Risk in Business Organizations

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Abstract. After COVID-19, the economy has become more fluctuating and is exposed to more kinds of risks, such as supply chain risk, exchange rate risk, and economic downturn risk. To maintain a relatively stable position under all kinds of risks, it's important for firms to develop efficient and useful risk management strategies. In this paper, according to real cases in past years, three important risks to business organizations are introduced. Through comparisons, some suggestions are made about how to construct efficient risk management methods. It can be concluded that futures and low-level long-term hedging strategies are useful in reducing supply chain risk. Interest rate swap contracts and forward foreign exchange contracts are able to reduce exchange rate risk. But for economic recession risk, typical financial derivatives don't have much effort, diversification is a more efficient risk management method. This paper analyzes efficient risk management methods for the three risks under current environments, providing suggestions and consultations for firms.

1 Introduction

Risk is always a controversial and attractive topic in business world. Nowadays, there are some major risk circumstances, such as Sino-US trade frictions, soaring RMB exchange rate, economic recessions, and fluctuations in raw material prices and supply chains. These major risks can mostly be categorized as supply chain risk, exchange rate risk and risk of economic downturn. For firms, they need to maintain and control as much risk as possible to reduce the possibilities of big losses or bankruptcy. Therefore, it's important for firms to develop risk management methods and control risks. To manage risks, there are many financial derivatives that can be used, such as options, futures and contracts. Among these methods, hedging is the most common one. Efficiently using hedging derivatives can help banks and firms have lower risks and higher values [1]. For supply chain risk, financial hedging is able to offset the risk of fluctuating commodity prices [2]. Using of derivatives to hedge exchange rate risk is more debated, the majority believe that derivatives have a positive effect on risk management. For example, Allayannis and Ofek found that currency risks reduced through

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the use of derivatives in large US manufacturing companies [3]. But some studies hold the opinion that currency derivatives have little impact on risk reduction [4]. This may be because of relatively expensive and excessive costs of hedging [5]. Apart from supply chain risk and exchange rate risk, risk of economic recession impacts firms more severely. It's shown that even using derivatives to hedge risks, firms' exposure to risks still increased [6]. These existing papers hold different opinions under different assumptions.

This paper will demonstrate risk management strategies in different scenarios, which is more comprehensive and systematic than existing literatures. Furthermore, this paper investigates and analyzes the reasons behind hedging effects to examine whether existing literatures' conclusions are supportive or not in specific and diverse situations. Through this paper's research, readers can strengthen their awareness and understanding of risks, thus choosing suitable risk management strategies.

2 Supply chain risk and corresponding strategies

2.1 Introduction of fluctuating raw material prices' risk

The risk of fluctuating raw material prices is the major component of supply chain risk. The typical examples of erratic raw material prices are coffee beans and fuel oils. Due to weather conditions, yields, crop diseases, and stocks, coffee beans' prices are non-stable and always changing. For fuel oils, the international crude oil price, demand elasticity, taxes, and oil qualities lead to complex and uncertain fuel oil prices. Raw materials' costs impact firms' profits a lot. It's not a rational method for firms to follow fluctuating prices and suffer big losses when prices soar. Firms need to develop strategies to reduce the risk.

2.2 Common risk management strategies for fluctuating raw material prices

Some financial derivatives are used widely to control fluctuating raw material prices, such as fixed price future contracts and forward contracts. These contracts enable firms to buy the underlying assets at the price that was decided before at a given date, thus reducing firms' risk of exposure to soaring raw materials' prices. Many firms use forward or future contracts to design hedging, thus keeping themselves in a relatively stable place: earn profits in good situation, and not lose much in bad situation.

2.3 Real cases and useful ideas

2.3.1 Risk management strategy of using fixed price future contracts: case of Starbucks

According to Office for National Statistics, during 2010 to 2011, coffee beans' prices soared from 237 pence in 2010 to 277 pence in 2011, which was the biggest and fastest increase in the past 10 years. In order to deal with the rapid increase in coffee bean prices, Starbucks bought coffee C future contracts in time, locking in the cost of coffee beans needed in 2010 and the first half year of 2011, controlling losses effectively [7]. This is a real case example that successfully used future contracts to control soaring raw material prices' risk, confirming efficiently using of financial derivatives can manage supply chain risks. The real case of Starbucks also showed an experience that when facing price increases, buying fixed price future contracts in time is very important.

2.3.2 A failure real case of using hedging strategies: China Eastern Airlines

Fuel oil price changes frequently and the price spread is big. In order to deal with the risk, China Eastern Airlines designed a hedging strategy formed by three options: long call options with strike price \$62.35/barrel-\$150/barrel for 11.35 million barrels of fuel, short put options with strike price \$62.35/barrel for 11.35 million barrels of fuel, and short call options with strike price \$72.35/barrel-\$200/barrel for 3 million barrels of fuel [8]. According to the hedging strategy, if oil price drops under \$62.35/barrel, long call option and short call option will not be exercised, but the short put option must be undertaken. Before 2008, the oil price kept increasing, but due to 2008 financial crisis, the oil price suddenly dropped to \$30.28/barrel [9]. Therefore, China Eastern Airlines lost 14 billion yuan from buying the oil that exceeded market price a lot and it caused great financial crisis for China Eastern Airlines [8]. The reason for its failure is that the strategy can only earn profits if oil price continued to increase but ignored the losses of falling prices. Therefore, this strategy is more likely to be an arbitrage strategy rather than a hedging strategy. To design successful hedging strategies, firms need to considerate both positive and negative sides of situations, ensuring the risks are controlled in affordable boundaries.

2.3.3 A successful real case of using hedging strategies: Southwest Airlines

Southwest Airlines also used hedging strategies to control its raw materials' costs. To form its hedging strategies, Southwest Airlines usually buys call options and enters into future contracts [10]. Southwest Airlines had traditions of pursuing low-level hedging and signing long-term hedging contracts, thus locking in raw materials' costs when they are low [10]. This is the biggest difference from Southwest Airlines to other airlines. Other airlines typically only hedge when prices are high. Thanks to Southwest Airlines' low-level hedging, during the 2008 fuel oil price drop, it successfully bought 70% of the oil it needed at \$51/barrel, rather than the \$130/barrel that other airlines had to pay [11]. The successful hedging strategy made Southwest Airlines stood out from other airlines during 2008. The reason of Southwest Airlines' successful risk control is its wise and traditional investment portfolio. Low-level long-term contracts ensured Southwest Airlines had low-cost raw materials in most times. Meanwhile, according to Southwest Airlines 2008 annual report, the investment portfolio is well-designed: Southwest Airlines mostly used options rather than futures in hedging strategies. This provided it with rights to exercise derivatives rather than obligations. When Southwest Airlines don't want to exercise options, it only loses the premiums rather than the whole costs in underlying assets. This offers more flexibility and choices for Southwest Airlines to control risks in different situations.

3 Exchange rate risk and corresponding strategies

3.1 Introduction of currency exchange rate risk

Currency exchange rate risk mostly exists in transnational corporations. These corporations buy raw materials, manufacture, recruit labors and sell products in different countries using different currencies. For example, airlines sell tickets in different countries, so the exchange rate between euros, dollars, RMB and so on impacts the revenues, profits and costs of airlines a lot. Furthermore, most international companies usually own foreign currency debts, which means the fluctuating exchange rate can impact the interest that the companies have to pay. Dollar to RMB exchange rate is noteworthy. From 2022-2025, it varies between 6.30 to 7.37 [12], which shows large fluctuations, apparent downward and upward trends. When foreign

currency appreciates, companies have to pay more interest which increases costs. Therefore, airlines need to form risk management methods to control currency exchange rate risk.

3.2 Common risk management strategies for currency exchange rate risk

In order to deal with currency exchange rate risk in foreign debts and transactions, there are many tools to use, such as leading and lagging strategies, netting, stop-loss orders, interest rate swap contracts and forward foreign exchange contracts. In interest rate swap contracts, given a specific amount of principle, two parties agree to exchange their interest rate payments but principles are unchanged, thus managing interest rate risk. For forward foreign exchange contracts, two parties agree to exchange a certain amount of currency to another currency at a predetermined exchange rate on a given day. Both methods are used to fix exchange rate at a predetermined value, ensuring a stable exchange rate and reducing the fluctuating risk.

3.3 Risk management practices of China Eastern Airlines

China Eastern Airlines is a firm that has transactions across China, US and Europe, so Chinese yuan exchange rate is extremely important for it. But during 2023 to 2024, Chinese yuan depreciated generally [12]. China Eastern Airlines has many long-term US dollar debts [13], which means it needs financial derivatives to hedge US debts' fluctuating interest rates and RMB to dollar exchange rate. In first half year of 2024, China Eastern Airlines bought and owned 48.68-million-yuan interest rate swap contracts and forward foreign exchange contracts, and the contracts take part of 0.07% of its reported net assets at the end of the period [13]. From the contracts, China Eastern Airlines earned 28 million yuan in the first half year of 2024 [13]. This means China Eastern Airlines' hedging strategy already showed some positive effects. The hedging strategy has two benefits. Firstly, it takes only a small part of the company's net assets, which reduces the hedging risk for entire company's finances. It also increases the flexibility of the company's cash flow. Secondly, both contracts ensure a stable interest rate and exchange rate for China Eastern Airlines to exercise, thus reducing the currency exchange rate risk and letting the company's finances be more easily to managed.

4 Economic recession risk and corresponding strategies

4.1 Introduction of economic recession risk

The world economy usually follows a business cycle of expansion, peak, recession, trough and recovery. There are some worldwide incidents that can impact the whole world economy largely and significantly, such as the 2008 financial crisis, 2010 European debt crisis and 2020 COVID-19, which corresponds to 2.9%, -0.4% and -2.7% global GDP growth rate respectively [14]. These crises negatively impact most countries' outputs, demands and investments. Because of its large-scale feature, it's difficult to get rid of economic recession risk. Under the environments of decreasing confidence, decreasing investments and dropping demands, firms can only try to mitigate the economic recession risk on their businesses rather than successfully overcome the risk.

4.2 Common risk management strategies for economic recession risk

Economic recession risk doesn't have specific and corresponding risk management strategies. Companies usually use all kinds of financial derivatives to deal with the parts in their companies that are most impacted. Typical methods are diversification, investment in low-risk assets and hedging. Diversification is able to spread the risk. Investment in low-risk assets such as treasury bonds provides firms with more defensive supports under low confident environments.

4.3 Real cases and useful ideas

4.3.1 A failed real case of using normal financial derivatives: Maersk

Maersk is one of the biggest container shipping companies in the world. During 2010 to 2012, the container shipping market was largely impacted by 2008 financial crisis and 2010 European debt crisis. As a result, global trades, demands for container and the freight charges all largely dropped. Maersk tried to reduce the economic recession risk by buying and using forward freight agreements then hedging through pure crude oil [15]. Since global demands for containers largely dropped due to economic recession, hedging through oil and freight could only reduce a small amount of price fluctuation. But economic recession led to decreasing freight volumes, which were not able to be fully hedged and controlled. As a result, Maersk lost 602 million during the 2011 economic recession risk [15]. Through past experiences in real cases, it can be concluded that financial derivatives and hedging can only control or reduce a limited part of price fluctuation during economic recession risk, but the risk's other impacts, such as reducing demands and investments, are not controllable by usual financial derivatives.

4.3.2 A successful real case of diversification: P&G

Diversification is a good way to spread and distribute risks especially during economic recessions. For example, Procter & Gamble (P&G) is a well-diversified firm. It has a diverse product portfolio: baby and family care goods, beauty organic goods, healthcare goods and some snacks and coffee [16]. Thanks to the diversified product range, P&G achieved a 9% increase in net sales and a 20% increase in diluted earnings per share even during the 2008 financial crisis [16]. P&G's success is due to the shared and diversified risks. With the demands decrease in one product area, other product areas may experience different opportunities and have increasing demands. This is more effective than just using financial derivatives to hedge prices which has no methods for decreasing demands. Diversification maybe more useful in economic recession risk as it has more opportunities to hedge and share risks among different product ranges.

5 Conclusion

This article reviews the necessity and management strategies of supply chain risk, exchange rate risk and economic recession risk, then provides additional evidence based on specific corporate practices. Through the research, it can be concluded that risk management is a crucial and significant process for firms to develop and follow. Normal financial derivatives and hedging strategies can reduce and manage supply chain risk and exchange rate risk. To design efficient hedging strategies, firms should consider both positive and negative outcomes, avoiding strategies that can only earn profits in one side of possibilities. Low-level

and long-term hedging contracts are mostly advised. For exchange rate risk, interest rate swap contracts and forward foreign exchange contracts are both useful and efficient. It's suggested that these contracts don't take a large part of firms' financial portfolio, to maintain firms' flexible cash flows and avoid hedging strategies to impact firms' total performances. However, financial derivatives' application in economic recession risk is relatively limited. Because these strategies can only manage one side of the risk. When facing economic recession risk, diversification is more suggested because it efficiently shares and reduces the risk among product ranges.

This paper demonstrates different risk management methods under different conditions, and through real case comparisons to make some suggestions about efficient and successful strategies. This paper is a more systematic and comprehensive analysis of risk managements in business organizations, which is helpful for firms to develop their own suitable risk management strategies. However, this paper is more likely to be a qualitative analysis. It only provides suggestions about which risk management strategies to choose, but does not indicate the specific amounts to buy or sell. It's expected that future research can provide more quantitative and practical analysis of business organizations' risk management.

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