

Toyota Motor's Exchange Rate Risk Management: Residual Risk and Response Strategies after Forward Hedging

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Abstract. In the context of global economic integration, exchange rate fluctuations have intensified, and the issue of exchange rate risks for multinational automakers has become a focus. This paper takes Toyota Motor as the research object and conducts an analysis based on the residual risks after foreign exchange forward hedging against exchange rate risks. Toyota is exposed to exchange rate risk due to its global layout, and can effectively hedge exchange rate risk by using foreign exchange forward contracts. However, three residual risks—basis risk, credit risk, and operational risk—remain after hedging, which undermine the company's financial profits and market operations. This paper puts forward the solutions of dynamically adjusting the term of the forward contract and hedging ratio, carefully selecting the counterparty, setting up the risk warning line, and improving the management of the operation process. In the future, it is expected that multinational automakers will improve the resolution of residual risks and promote the stability of their global operations.

Keywords: Residual risk; exchange rate risk; risk hedging.

1. Introduction

Against the background of deepening global economic integration and frequent geopolitical conflicts, the international economic environment is becoming more and more complex and changeable. Exchange rates, a variable that directly affects cross-border trade and corporate profitability in the global economic system, are influenced by multiple factors such as adjustments in monetary policies of various countries, tense trade situations, and geopolitical crises, presenting a high-frequency and significant fluctuation trend.

The automotive industry, as a highly globalized sector, has an industrial chain spanning multiple countries and regions. Multinational automakers' global layout of production bases, purchase of components, and conduct of sales activities will inevitably bring about exchange rate risks [1]. Companies with large overseas business scales generally have significant foreign exchange risk exposure [2]. As a leading global automotive enterprise, Toyota maintains an extensive international presence, with production bases in over 30 countries and products distributed across global markets. In addition, Toyota needs to purchase a large number of components from outside Japan every year, which involves settlement in various currencies such as US dollars, euros, and RMB. The multi-currency payment system makes it highly vulnerable to the impact of exchange rate fluctuations between currencies [3].

Large companies generally use forward contracts to hedge against exchange rate risks, which can reduce the fluctuations in costs and revenues by locking in future exchange rates [4]. To address exchange rate risks, Toyota uses foreign exchange forward contracts for hedging. However, foreign exchange forward hedging is not completely risk-free. It is affected by the limitations of contract design, unexpected market fluctuations, and loopholes in the operation process. Even after hedging, enterprises will still retain residual risks such as basis risk, credit risk, and operational risk. And these risks will hurt the financial profits and market operations of enterprises [5].

At present, the existing literature studies rarely mention the residual risks after forward hedging of foreign exchange. This paper presents the basis risk, credit risk, and operational risk that still exist after hedging forward contracts. This paper further proposes three targeted solutions: dynamically adjusting forward contract terms and hedging ratios, carefully selecting contract counterparties, establishing risk early warning thresholds, and optimizing operational process management.

Under this background, it is of great significance to conduct research on exchange rate risk for Toyota Motor based on the residual risk and response strategy after foreign exchange forward hedging. It can provide possible problems in exchange rate risk management for multinational automobile enterprises, optimize foreign exchange hedging strategies for enterprises in the same industry, and effectively control the residual risks after hedging.

However, the research scope of this paper is limited to a single enterprise, lacking industry comparative analysis, and thus has limitations. This article only takes Toyota Motor as a research case. Although it can deeply analyze the residual risks and countermeasures after foreign exchange forward hedging, it does not compare with the risk management models of other multinational automakers, such as BMW and Volkswagen, and thus cannot comprehensively reflect the common problems and differentiated strategies in the industry.

2. Toyota Motor's Case Study

2.1. Toyota Motor's Exchange Rate Risk Background

In the global automotive industry, Toyota Motor Corporation holds a leading position thanks to its “local R&D + overseas production + global sales” model. However, this global presence also exposes Toyota to significant exchange rate risk. First, from the production perspective, as of fiscal 2024, Toyota Motor's overseas production bases have reached more than 30 countries around the world. Toyota Motor's fiscal 2024 financial report indicates its global production reached 9.68 million units, including 3.236 million units produced in Japan and 6.444 million units in overseas regions. The production of overseas production bases accounted for approximately 66.6% of the total production. For example, Toyota Motor Corporation has set up an engine production base in Thailand to provide key engine components to the world. Second, from the sales perspective, Toyota's global sales reached 9.362 million vehicles in fiscal 2024, with 1.991 million sold in Japan and 7.372 million in overseas regions—representing 78.7% of total sales. Third, from the procurement perspective, German electronic control systems have become an indispensable part of Toyota's high-end models due to their high precision and stability. Thai engines are widely used in various Toyota models because of their high cost-effectiveness. While this multi-regional supply optimizes performance and reduces costs, it also greatly increases exchange rate risks.

Since Toyota's operations involve settlement in more than ten currencies, including the Japanese yen, US dollar, and euro, any slight fluctuation in exchange rates may have a direct and significant impact on its core business operations. For example, during the fiscal year 2024-2025, fluctuations in the yen-dollar exchange rate and adjustments to US tariff policies had a significant impact on Toyota's profits. In its 2024 financial report, Toyota predicts that tariffs could result in a 180-billion-yen loss in operating profit in April and May 2025. Furthermore, Toyota's overseas profits shrink when converted back to yen, and its 2024 financial report attributes this shrinkage to the appreciation of the yen—this trend has severely impacted the company's overall profitability. In the first quarter of fiscal 2025, Toyota's net profit fell 36.9% year-on-year to 841.3 billion yen, while operating profit was 1,166.1 billion yen, down 11% year-on-year. It can be seen that exchange rate risk has become a core risk that Toyota cannot avoid in its global market operations.

2.2. Application of Foreign Exchange Forward Hedging Strategy

2.2.1 Hedge Target

In Toyota's global layout, the “local R&D + overseas production + global sales” model has created exchange rate risk exposure, and this risk has had a direct impact on supply chain costs, overseas revenue stability, and consolidated financial statement profitability. The design of foreign exchange forward hedging targets should address the aforementioned practical risks and ensure the adaptability and feasibility of the strategy. Hedging targets can be developed from three perspectives: cost, revenue, and financial reporting.

First, on the cost side, because Toyota's overseas parts procurement accounts for a high proportion and involves the risk characteristics of multi-regional currency settlement, the hedging target should address the impact of exchange rate fluctuations in the procurement process. By signing foreign exchange forward contracts, Toyota locks in the exchange rates between purchasing currencies—such as the euro, Thai baht, and Japanese yen—and the yen within a specific future period. Locking in exchange rates through foreign exchange forward contracts will control the fluctuation range of the unit purchasing cost of parts within a preset safety range, avoiding a sharp jump or abnormal fluctuation in purchasing costs due to unilateral changes in exchange rates, thereby ensuring the stability of global supply chain costs.

Second, on the revenue side, because Toyota's overseas sales account for a high proportion of total sales and its business characteristics are clearly distributed in regional markets, the hedging target can be centered around stabilizing the yen-converted value of overseas sales revenue. For sales revenue settlement currencies in core overseas markets such as North America and Europe, such as the US dollar and the euro, forward contracts are used to hedge the exchange rate risk of quarterly accounts receivable during the settlement period, to avoid differences in overseas revenue converted into Japanese yen due to exchange rate fluctuations between the settlement currency and the Japanese yen, which would hurt the company's financial performance [6].

Third, on the reporting side, because the profits of Toyota's overseas subsidiaries need to be converted into Japanese yen and included in the group's consolidated financial statements, the hedging target should address the exchange rate risk in the profit conversion process. By using forward contracts to hedge the risk of translating part of the net profit of overseas subsidiaries, the impact of exchange rate fluctuations on the operating profit in the group's consolidated financial statements is reduced, and the overall profit fluctuation range is controlled within the range that management can tolerate, thus ensuring the overall profitability stability of the group.

2.2.2 Core Operations

The operation of foreign exchange forward contracts can be divided into three aspects: contract term design, hedging ratio adjustment, and currency portfolio construction.

First, in terms of contract term design, Toyota selects appropriate forward contract terms based on the time periods of different business segments, thereby reducing basis risk caused by maturity mismatch. From the procurement side, because most parts orders are short-term, short-term forward contracts are usually signed to accurately match the procurement payment cycle to ensure that the procurement cost is locked in line with the payment rhythm. On the sales side, given the relatively long collection period in overseas markets, medium-term or long-term forward contracts should be signed to cover the entire collection cycle to avoid the impact of exchange rate fluctuations during the collection cycle on revenue conversion. In long-term investments such as overseas factory construction, due to the long project cycle and large capital investment, it is necessary to sign long-term forward contracts to hedge the exchange rate risks in the long-term payment process and ensure the stability of investment costs.

Second, at the level of hedging ratio adjustment. It is necessary to flexibly optimize the hedging ratio of forward contracts based on expectations of exchange rate fluctuations and changes in business scale. This can not only avoid the problem of excessively high contract costs under the full hedging model, but also prevent the hidden danger of excessive risk exposure under the low hedging model. When market exchange rate fluctuations enter a sharp range, risk resistance can be enhanced by increasing the hedging ratio to reduce the impact of exchange rate fluctuations on operations. When the exchange rate is in a relatively stable range, the hedging ratio can be appropriately reduced to control operational costs, such as contract fees, and improve the economic efficiency of the hedging strategy. For emerging markets with large currency fluctuations, due to higher exchange rate uncertainty, it is necessary to maintain a relatively high fixed hedging ratio to prevent sudden risks that may be caused by extreme exchange rate fluctuations.

Third, in terms of currency portfolio construction. In view of the fact that Toyota's global business involves multiple types of settlement currencies, a multi-currency forward contract portfolio with the

main settlement currency as the core can be constructed. Core currencies involved in overseas sales and procurement, such as the US dollar and the euro, are taken as key hedging targets. At the same time, forward contracts of other regional settlement currencies, such as the Thai baht and the Mexican peso, are used to form a full-chain exchange rate risk management network for procurement payments, sales collections and overseas investments, ensuring that the settlement needs of each business link can receive targeted exchange rate risk hedges, avoiding residual risk exposure caused by omissions in single currency hedging.

3. Residual Risk of Toyota Motors after Foreign Exchange Forward Hedging

3.1. Residual Risk Type

Although Toyota has systematically hedged its exchange rate risk through foreign exchange forward contracts, due to factors such as the complexity of the market environment, limitations in contract design, and uncertainty in operational processes, there may still be three residual risks that cannot be eliminated: basis risk, credit risk, and operational risk.

Firstly, basis risk. Because the deviation between the exchange rate agreed in the forward contract and the market spot exchange rate at the time of actual settlement will generate basis risk [7]. Although Toyota has covered different business links through short-term, medium-term, and long-term contracts, there are still two deviations in actual operations. The first is a maturity mismatch caused by sudden changes in the business cycle. For example, overseas parts suppliers delay delivery due to production capacity issues, causing the originally signed 3-month short-term purchase contract to be out of line with the actual 6-month payment cycle. The difference between the spot exchange rate and the contract exchange rate at the time of maturity settlement causes basis loss. The second is the widening of the basis caused by the unexpected exchange rate fluctuations. When the short-term volatility of the Japanese yen against core currencies such as the US dollar and the euro exceeds the historical average, even if the contract term is completely matched with the business cycle, the predicted deviation of the forward exchange rate from the spot exchange rate will significantly increase, resulting in the hedging effect being less than expected.

Secondly, credit risk. Credit risk generally arises from the uncertainty of the performance ability of the counterparty of the foreign exchange forward contract, such as commercial banks and financial institutions [8]. It may also stem from changes in the credit status of suppliers, distributors, and other partners with whom Toyota engages in overseas business cooperation. From the perspective of the counterparty, the multi-currency forward contracts signed by Toyota rely on large global banks as counterparties. If a partner bank's credit rating is downgraded due to factors such as a macroeconomic downturn and a liquidity crisis, its ability to perform will decline accordingly, which may result in the inability to complete delivery at the agreed exchange rate when the contract expires, causing Toyota to purchase foreign exchange in the spot market at a higher cost. From the perspective of business partners, if overseas dealers delay or are unable to pay for goods due to declining market demand, broken capital chain, etc., Toyota's originally locked-in sales collection forward contracts will lose the corresponding cash flow support. Not only will they be unable to hedge exchange rate risks through contracts, but they will also have to bear the dual pressure of contract penalties and bad debt losses.

Thirdly, Operational risk. Operational risks may arise from factors such as internal process loopholes, human errors, and system failures during operations. During the contract design phase, if the finance department fails to promptly synchronize business adjustments from overseas subsidiaries, the currency type and scale of forward contracts will mismatch actual demand, thereby creating operational risk exposure. During the contract execution phase, staff's misjudgment of exchange rate fluctuation data and omission of contract terms may also lead to the contract's failure to take effect normally [9]. During the settlement process, the foreign exchange trading system may miss the delivery window due to cross-border network delays, data synchronization errors, and other failures, causing Toyota to accept an unfavorable real-time exchange rate settlement.

3.2. The Impact of Residual Risk on Toyota

First, the impact on Toyota's finances. All three residual risks may directly affect financial indicators due to increased costs or reduced revenue. The deviation between the contract exchange rate and the settlement exchange rate caused by basis risk will be converted into exchange losses or additional procurement costs, reducing operating profit margins [10]. If the counterparty defaults due to credit risk, Toyota will need to bear the cost of foreign exchange in the spot market and bad debt losses. Operational risks may lead to unexpected expenses such as system failures and contract mismatches. Although the individual losses are relatively small, the accumulated losses will further reduce profits and weaken the stability of profitability.

Second, the impact on Toyota's market. The additional costs caused by basis risk and operational risk cannot be diluted, resulting in Toyota raising prices for some models and losing its price advantage. Credit risk may cause suppliers or distributors to default, resulting in production disruptions or reduced orders, missing out on some market demand, and affecting long-term market share expansion.

4. Toyota's Residual Risk Response Measures

In response to the impact of basis risk, credit risk, and operational risk on the financial and market levels described above, Toyota can minimize the negative impact of residual risk by dynamically adjusting hedging strategies, strengthening counterparty control, and improving internal operating mechanisms.

4.1. Dynamically Adjust forward Contract Terms and Hedging Ratios

The main causes of basis risk are the mismatch between contracts and businesses and unexpected exchange rate fluctuations, so it is necessary to dynamically adjust forward contracts and hedging ratios. In terms of contract term adjustment, in response to sudden changes in the business cycle on the purchasing side, the delivery term is allowed to be adjusted according to the actual business cycle to avoid basis losses due to term mismatch. In response to fluctuations in the collection cycle at the sales end, based on the prediction of exchange rate volatility based on macroeconomic data, fixed-term contracts can be changed to step-term contracts, and the decision on whether to renew the contract can be made based on the magnitude of exchange rate fluctuations, thus reducing the prediction bias of long-term contracts on short-term exchange rate fluctuations.

In terms of hedging ratio adjustment, Toyota can access real-time exchange rate data platforms to set exchange rate volatility warning thresholds. When the threshold is triggered, the hedging ratio of the corresponding area will be automatically increased.

4.2. Carefully Select Contract Counterparties and Set Risk Warning Lines

The core of credit risk lies in the uncertainty of the counterparty's ability to perform, so it is necessary to choose the contract counterparty carefully. For banking counterparties, core partners are screened based on authoritative credit ratings and combined with indicators such as the capital adequacy ratio and liquidity coverage ratio, and the contract size proportion of a single counterparty is limited to avoid over-reliance on a single counterparty. For suppliers and distributors, the qualifications of partners participating in forward contracts are limited, and differentiated prepayment ratios are set for partners with different credit ratings to reduce default losses.

When setting risk warnings, set credit rating downgrade warnings and performance delay warnings, and immediately suspend adding new contracts when the warning is triggered. At the same time, credit risk reserves are set aside at a fixed ratio based on the annual forward contract size to prevent additional costs incurred by counterparty defaults, thereby mitigating cash flow shocks.

4.3. Improve Management of Operational Processes

In terms of process standardization, operational standards for each link are set, including timely synchronization of subsidiary business data, repeated verification of terms by multiple people, and setting of pre-delivery reminders. Cross-departmental double signatures are required to confirm contracts in key areas to avoid currency or scale mismatches due to data asynchrony. At the same time, establish a backup trading channel to reduce unexpected expenses caused by system failures, delivery delays, and other problems.

In terms of professional personnel training, foreign exchange risk management training is organized on an annual basis, and personnel in operational positions are required to pass qualification certification before they can take up their posts. At the same time, responsibilities and corrective measures for losses caused by human errors are clarified to strengthen risk awareness.

5. Conclusion

This paper takes Toyota Motor as the research object to analyze its exchange rate risks under global operations, including the application of foreign exchange forward hedging strategies, the types and impacts of residual risks, and targeted countermeasures. The following conclusions are drawn: First, Toyota's "domestic R&D + overseas production + global sales" model creates exposure to exchange rate risk. Overseas investment in production, multi-currency payments in procurement, and the translation of overseas revenue on the sales side all contribute to this risk. Toyota uses foreign exchange forward contracts to hedge this risk. Second, after foreign exchange forward hedging, basis risk, credit risk, and operational risk remain. These three residual risks will hurt corporate financial profits and market stability. Third, to address the three types of residual risks, this paper proposes solutions such as dynamically adjusting the forward contract term and hedging ratio, carefully selecting contract counterparties and setting risk warning lines, and improving the management of operational processes.

In the future, as multinational companies continue to develop and improve, it is expected that they will be able to more comprehensively respond to residual risk challenges in complex market environments after foreign exchange forward hedging.

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