The Impact of Exchange Rate Fluctuation on Toyota Financial Performance and Its Hedging Strategy

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Abstract. In today's globalised economy, the majority of businesses operate in many nations, utilising foreign exchange for imports and exports to expose them to foreign exchange risk. Every business is more or less affected by foreign exchange risk, which is made up of transaction risk, translation risk, and economic risk. By analyzing Toyota's financial reports and comparing financial data of multiple fiscal years (2018 is the base year), including Toyota's derivatives trading volume, foreign exchange income, exchange rate fluctuations of Japanese yen relative to other major currencies, and the average transaction price of currency trading, this study studied the role of financial derivatives in Toyota's foreign exchange risk management. The research results show that Toyota's derivatives transactions in 2018, including forward foreign exchange future contracts and foreign exchange options, strongly offset the foreign exchange risk caused by the appreciation of the yen against the US dollar and the euro. In addition to the derivatives transactions, Toyota also used other risk management policies to reduce its foreign exchange risk. Although the use of financial derivatives can hedge risks, but it will also bring losses to the enterprise. In today's volatile global business environment, each enterprise must choose the appropriate risk management tools for it.

Keywords: Foreign exchange risk; foreign exchange option; hedge; large multinational company.

1. Introduction

The operations and profitability of a firm will be significantly impacted by changes in currency rates in the current climate of escalating globalisation and exchange rate volatility. The number of major international corporations is growing, which is causing a rise in the worldwide flow of foreign currency. Exchange rate swings have an impact on small and medium-sized businesses in addition to major international organisations. The risk that changes in exchange rates will have an impact on a company's operations and profitability is known as exchange rate risk.

Typically, there are three exposures that make up exchange rate risk. First, corporations making or receiving payments in foreign currencies are affected by exchange rate swings, which leads to transaction vulnerability. The bottom line of the business may be impacted if the exchange rate changes unfavourably since it may cause an increase in payments or a drop in receivables. The second definition of "translation exposure" is the impact of exchange rate fluctuations on the company's consolidated financial statements. A significant global firm, for instance, has a few subsidiaries abroad. The corporate headquarters will combine all subsidiaries' financial accounts at the conclusion of the fiscal year. If the exchange rate changes, it will affect the consolidated statement. The third is economic exposure, which is the impact of macro-level risks on multinational and domestic companies. Specifically, if the exchange rate changes, it may affect imports and exports, thereby affecting domestic producers.

For large multinational corporations such as Toyota, McDonald's and Apple, foreign currency revenue and payments are an important part of their finances. According to Toyota's 2022 financial report, its total revenue in 2022 is 40481.2 billion yen, and more than 60% of its revenue comes from outside Japan. It can be seen that if Toyota wants to remit income from overseas to domestic, the exchange rate will have a great impact on it. Specifically, for example, in 2022, Toyota's revenue in North America accounts for 27.23% of its total revenue. Normally, Toyota will convert foreign currency earnings received in North America into Japanese Yen for further investment in Japan or as retained earnings at the head quarter in Japan. If the U.S. dollar depreciates against the Japanese Yen

during currency exchange, one U.S. dollar can only buy fewer Japanese Yen. In this case, it will reduce the yen received by Toyota when exchanging currency, which will reduce Toyota's yen income, and on the contrary, it will increase yen income.

In order to reduce the impact of exchange rate changes on profitability, large multinational companies usually have several methods to deal with foreign exchange risk. First, try to trade in the domestic currency as much as possible to reduce the exposure to foreign exchange risk. Because the smaller the amount of foreign currency revenue received, the smaller the impact of exchange rate changes on profitability. Secondly, natural foreign exchange hedging is also a simple and easy-to-understand method. When a business can match its revenue and costs in a foreign currency, it engages in natural foreign exchange hedging, which reduces or completely eliminates net risk. For instance, Toyota pays all of its employees in Europe salaries and builds plants in Europe with its whole euro revenue. Finally, hedging through financial derivatives is the most used method, but also the most complex. Large multinational corporations often use foreign exchange forward contracts and currency options to reduce foreign exchange exposure.

2. Literature review

Nowadays, there are many literatures on the foreign exchange risk of large enterprises. With the acceleration of globalization, the foreign exchange risk faced by enterprises becomes more and more impossible to ignore. No matter the domestic company whose overseas income is only a small part of the company, or the international trading company whose overseas income is a large part, the foreign exchange risk will more or less affect the company's profitability. In his research, Gregory W Brown clarified the connection between corporate profitability and exchange rate market fluctuations [1]. There has been a great deal of theoretical and empirical study on the risk management strategy of non-financial organisations, but surprisingly little is known about the actual hedging practises used by multinational corporations.

Jia He and Lilian K. Ng (2002) [2] studied the stock returns of numerous Japanese multinational corporations and discovered that 25% of them had positive exposure to economic risks (including one exposure to foreign exchange risk), indicating that the appreciation or depreciation of the yen in relation to other currencies affects the stock returns of Japanese multinational corporations in a positive (or negative) way. Their conclusion shows the huge impact of exchange rate fluctuations on Toyota's operating cash flow and its discount rate. The literature also finds that high-leverage or illiquid Japanese firms have less risk exposure to foreign exchange risk [2]. At the same time, the larger the scale of multinational companies like Toyota, the greater the foreign exchange risk. One distinguishing feature of Japanese companies is the existence of industrial groups, which we call keiretsu. Toyota, as a typical keiretsu multinational, strong evidence has proved that such a company is more susceptible to foreign exchange risk than non-Keiretsu companies.

Besides, in order to figure out how corporate finance such as foreign cash flow affect the profitability, Suranjan Bhattacheryay [3] took Toyota as an example to describe the impact of working capital management on the company, especially the connection between working capital and the foreign exchange market in terms of profitability [4]. For other non-financial companies in Asia, Lee-Lee Chong, Xiao-Jun Chang and Siow-Hooi Tan [5] found that non-financial enterprises' hedging decisions are driven by their assertiveness toward the market and regulators as well as by how flexible they are with regard to derivative instruments. A key factor in persuading businesses to implement hedging methods is the intellectual capacity they develop. Mihir Dash et al [6] used strategies such as forward currency contracts, currency options and cross currency hedging to study the profits generated by different foreign exchange cash flows [7]. This study empirically solved the problem of which strategy is the best to use in different situations. In terms of the different foreign exchange risk exposures (transaction exposure and economic exposure), In some circumstances, where enterprises have production flexibility, a portfolio of currency options may be built to hedging economic risk, according to studies by RogerWare and RalphWinter [8, 9]. However, in more widespread

circumstances (like the one Toyota is currently in), when there is doubt over a number of currency rates, more elaborate options are needed to fully hedge economic risks than are currently available.

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3. Case Study

Toyota Motor Corp. (Toyota) is a large multinational company that designs, manufactures, and sells a wide range of automobiles. It also has the business in the housing, telecommunications, financial services, and IT industries. It conducts business across the Americas, Europe, Africa, the Middle East, and the Asia-Pacific.

According to Toyota's 2018 report [10], Toyota has a total of 67 factories and manufacturing companies, 169 distributors and 10 R&D centers around the world. Its total number of employees is 369,124, of which Japanese employees account for the majority. In addition, Toyota sold a total of 8,964,394 vehicles worldwide in 2018, most of which were sold to North America (about 30%). From the perspective of finance, Toyota’s market capitalization in 2018 is 165.27 billion U.S. dollar. Toyota’s net income for 2018 was 2,003,973 million yen, and its profit was 173,816 million yen.

Specifically, in Toyota's 2018 financial report [10], the net income in Japan was 11741.3 billion yen, the net income in North America was 8029 billion yen, the net income in Europe was 2312 billion yen, the net income in Asia was 3825.9 billion yen, and the net income in other regions Including South America, Oceania, Africa and the Middle East net income is 1854 billion yen. It can be seen that in 2018 Toyota received 57.71% of its total revenue in places other than Japan. However, since these revenues are not denominated in yen, Toyota needs to convert these foreign currency revenues into yen for remittance to the head quarter, or for consolidation into consolidated financial statements. The exchange rate of the dollar, euro and other foreign currencies against the yen will greatly affect Toyota's final earnings.

Toyota employed foreign exchange forward contracts and foreign exchange option contracts to hedging foreign exchange risks in 2018, the majority of which are forward contracts, according to Toyota's 2018 financial report [10].

3.1 Financial data of using derivatives to hedge foreign exchange risk for FY2018

Figures 1 and 2 are excerpts from Toyota's 2018 financial results [10], which contain detailed information about Toyota's use of forward currency contracts and foreign exchange options in 2018. These two figures essentially describe how Toyota hedge against foreign exchange risk by using forward foreign exchange contracts and foreign exchange options. In Figure 1, we can find that Toyota uses 8 different forward currency contracts containing 6 different major sources of foreign exchange (currencies). Meanwhile, we can also see the average transaction price of each currency relative to another currency traded in the forward contracts. At the bottom of Figure 1, we can see that Toyota uses three different foreign exchange options, including Japanese yen, US dollar, Euro and Australian dollar, with each average transaction price.

	Notional principal				Average price
	Within one year	Over one year but within five years	Over five years	Total	
Foreign currency risk					
Foreign currency forward contract transactions					
BUY JPY / SELL USD (Millions of U.S. dollars)	90	–	–	90	JPY 108.14
BUY EUR / SELL USD (Millions of euros)	75	–	–	75	USD 1.23
BUY SEK / SELL USD (Millions of U.S. dollars)	5	–	–	5	SEK 8.03
BUY SEK / SELL EUR (Millions of euros)	253	6	–	260	SEK 9.97
BUY SEK / SELL GBP (Millions of British pounds)	85	–	–	85	SEK 11.19
BUY SEK / SELL AUD (Millions of Australian dollars)	247	–	–	247	SEK 6.36
BUY USD / SELL SEK (Millions of U.S. dollars)	99	–	–	99	SEK 8.15
BUY EUR / SELL SEK (Millions of euros)	56	1	–	57	SEK 10.08
Foreign currency option contract transactions					
BUY JPY / SELL USD (Millions of U.S. dollars)	108	–	–	108	JPY 108.03
BUY JPY / SELL EUR (Millions of euros)	44	–	–	44	JPY 132.98
BUY JPY / SELL AUD (Millions of Australian dollars)	15	–	–	15	JPY 84.42

Fig. 1 Principals and average trading prices of hedging instruments ends March 31, 2018

By comparing Figure 1 and Figure 2 [10], we can find that there are two obvious changes: the short-term nominal principal of the two forward foreign exchange contracts, BUY SEK/SELL EUR and BUY EUR/SELL SEK, decreased by 241.11% and 271.43% respectively. At the same time, the average transaction price of the two contracts rose 5% each. This indicates that the SEK has appreciated significantly against the euro in 2018, thus exposing Toyota to greater foreign exchange risk.

	Notional principal				Average price
	Within one year	Over one year but within five years	Over five years	Total	
Foreign currency risk					
Foreign currency forward contract transactions					
BUY JPY / SELL USD (Millions of U.S. dollars)	56	–	–	56	JPY 112.14
BUY EUR / SELL USD (Millions of euros)	–	–	–	–	USD –
BUY SEK / SELL USD (Millions of U.S. dollars)	28	–	–	28	SEK 8.90
BUY SEK / SELL EUR (Millions of euros)	863	12	–	875	SEK 9.46
BUY SEK / SELL GBP (Millions of British pounds)	58	1	–	59	SEK 11.10
BUY SEK / SELL AUD (Millions of Australian dollars)	193	–	–	193	SEK 6.72
BUY USD / SELL SEK (Millions of U.S. dollars)	71	–	–	71	SEK 8.97
BUY EUR / SELL SEK (Millions of euros)	208	1	–	209	SEK 9.55
Foreign currency option contract transactions					
BUY JPY / SELL USD (Millions of U.S. dollars)	102	–	–	102	JPY 113.10
BUY JPY / SELL EUR (Millions of euros)	44	–	–	44	JPY 120.79
BUY JPY / SELL AUD (Millions of Australian dollars)	13	–	–	13	JPY 85.14

Fig. 2 Principals and average trading prices of hedging instruments ends March 31, 2017

Figure 3 from Toyota's 2018 annual report [10] details the financial derivatives the company deployed in FY2017 and FY2018 to manage interest rate and foreign currency risk. Forward foreign exchange contracts and currency options can be used to manage foreign exchange risk. Interest rate swaps and interest rate and exchange rate swaps can be used to manage interest rate risk. Figure 3 shows that when data from 2017 and 2018 are compared, the assets of forward foreign currency contracts grew by 71.18%, from 650 million yen to 2255 million yen. Meanwhile, the liabilities of forward foreign exchange contracts increased by 52.27% from 11.4 million yen to 23.97 million yen. This indicates that during the 2018 fiscal year, to actively manage currency risk, Toyota employed forward foreign exchange contracts. Figure 3 depicts a little change in the assets and liabilities of foreign exchange options between FY18 in addition to forward foreign exchange contracts.

ii) Carrying amount of hedging instruments

FY2017 (As of March 31, 2017)

(Millions of yen)

	Carrying amount of hedging instruments		Line items on the Consolidated Statement of Financial Position
	Assets	Liabilities	
Foreign currency risk			
Foreign currency forward contract transactions	650	1,144	Other financial assets and liabilities
Foreign currency option contract transactions	142	72	Other financial assets and liabilities
Total foreign currency risk	793	1,217	Other financial assets and liabilities
Interest rate risk			
Interest rate swap transactions	345	125	Other financial assets and liabilities
Interest rate and currency swap transactions	13,462	2,217	Other financial assets and liabilities
Total interest rate risk	13,807	2,342	Other financial assets and liabilities
Total hedging instruments	14,600	3,560	Other financial assets and liabilities

FY2018 (As of March 31, 2018)

(Millions of yen)

	Carrying amount of hedging instruments		Line items on the Consolidated Statement of Financial Position
	Assets	Liabilities	
Foreign currency risk			
Foreign currency forward contract transactions	2,255	2,397	Other financial assets and liabilities
Foreign currency option contract transactions	137	14	Other financial assets and liabilities
Total foreign currency risk	2,393	2,411	Other financial assets and liabilities
Interest rate risk			
Interest rate swap transactions	373	136	Other financial assets and liabilities
Interest rate and currency swap transactions	2,026	3,618	Other financial assets and liabilities
Total interest rate risk	2,399	3,754	Other financial assets and liabilities
Total hedging instruments	4,793	6,165	Other financial assets and liabilities

Fig. 3 Carrying amount of hedging instruments FY2017 and FY2018

Utilizing derivative financial instruments is one method that businesses like Toyota may control their foreign currency risk. Financial contracts known as derivatives get their value from how well an underlying asset, such as a currency, good, or stock index, performs.

Currency options are one type of derivative that may be used to lower the risk involved with foreign exchange. A currency option is a contract that gives the holder the right—but not the obligation—to buy or sell a certain currency at a specified exchange rate on or before a specified date.

The two main types of currency options are call options and put options. A call option grants the right to buy a specific currency at a certain exchange rate, whereas a put option grants the right to sell a particular currency at a specified exchange rate.

Toyota may employ currency options in a variety of ways to reduce its exposure to foreign exchange risk. For instance, if the business anticipates that the Japanese yen will rise in value versus

the dollar, it can acquire currency call options that would grant it the right to purchase dollars at a predetermined exchange rate in the future. Toyota might do this to lock in a good exchange rate and safeguard its revenue that is denominated in US dollars from prospective losses brought on by exchange rate changes.

As an alternative, Toyota may buy currency put options that grant it the right to sell US dollars at a predetermined exchange rate at a later time if it anticipates that the value of the yen will decline against the dollar. By doing this, the business would be able to sell its U.S. dollar-denominated revenues at a fixed exchange rate and save any losses brought on by fluctuating currency rates.

In both situations, Toyota may manage its foreign exchange risk and shield its financial performance from the effects of exchange rate changes by using currency options. Of course, there are also risks associated with using currency options to hedge foreign exchange risk. For example, if Toyota buys a currency call option and the value of the yen does not appreciate against the dollar as expected, the company may lose the premium paid for the option. Similarly, if Toyota buys a currency put option and the value of the yen does not depreciate against the dollar as expected, the company may also lose the premium paid for the option.

3.2 Drawbacks of foreign exchange option

But for Toyota, there are always drawbacks to using options to hedge risk. On the one hand, they may not provide complete protection. In some cases, the exchange rate may move in a way that is not covered by the terms of the currency option, leaving the hedger exposed to some degree of currency exchange risk. Because there are many kinds of foreign exchange income received by Toyota, such as US dollar, euro, RMB and Swedish currency, etc., the foreign exchange risk brought by these different currencies cannot be completely offset by currency options. On the other hand, Toyota may be subject to liquidity risks. Depending on the market conditions, it may be difficult to buy or sell a currency option at a favorable price. This can make it challenging to adjust the hedge in response to changing market conditions.

4. Conclusion

In addition to currency options, there are other financial derivatives that can be used to hedge foreign exchange risk. With the agreement to reverse the exchange at a later time, a currency swap is a financial instrument that enables two parties to exchange a certain quantity of one currency for another. Finding the exact currency exposure to be hedged, deciding on the proper swap terms, locating a counterparty, executing the swap, and then managing the swap during its duration are the steps involved in using a currency swap to reduce foreign exchange risk.

However, foreign currency futures are also frequently utilised to reduce the risk associated with foreign exchange rates. Standardized agreements to purchase or sell a certain currency at a fixed exchange rate at a later period are known as currency futures. They may be used by businesses to hedge their foreign exchange risk because they are traded on exchanges. To use currency futures to reduce foreign exchange risk, you must first determine the precise currency exposure that needs to be reduced, choose the right futures contract, choose a brokerage, and create an account.

Balance sheet management is used in many large companies and banks to hedge their foreign exchange risk. Balance sheet management: By carefully managing its balance sheet, a company can reduce its exposure to foreign exchange risk. For example, it can minimize its net foreign currency liabilities by matching its foreign currency assets and liabilities, or by using natural hedges, such as sourcing inputs in the same currency as its sales.

In addition to these specific hedging techniques, a large multinational company like Toyota can also implement a comprehensive risk management policy to identify and manage its foreign exchange risks. This can include regular monitoring of the foreign exchange markets, setting limits on the amount of exposure to currency risk, and diversifying its foreign currency holdings to reduce the impact of any individual currency movements.

Overall, there are many different ways that a large multinational company can hedge its foreign exchange risk, and the best approach will depend on the company's specific circumstances and risk management objectives.

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