

How the Changes of Foreign Exchange Affect the Financial Risks of Multinational Corporations -- The Case is Toyota's Financial Crisis Caused by Foreign Exchange in 2008

Yukai Wang

*Wenzhou Kean University, Wenzhou, China
1235631@wku.edu.cn*

Abstract. This study explores the impact of the changes of exchange rate on the financial risks of multinational corporations, using the financial crisis suffered by Toyota in 2008 due to exchange rate fluctuations as a case study. The main purpose of this study is to analyse the specific impact of exchange rate changes on the risk of multinational corporations from multiple perspectives. By comparing data from Toyota and four other multinational corporations, we use regression analysis to identify and evaluate the relationship between exchange rate changes and multinational corporation risk. The study not only reviewed previous research by financial and economic scholars, but also analysed and reflected on them to find the connection between theory and practice. Through this method, we expect to gain a detailed understanding of the types of risks that businesses may face under different exchange rate changes and evaluate management strategies for these risks. The conclusion of this article will help deepen our understanding of the challenges and strategies that multinational corporations face in responding to exchange rate changes in a globalized economic environment, thereby providing practical guidance and strategic recommendations for financial risk management. In addition, the research findings may also reveal how companies enhance their financial stability and ability to sustain growth through effective risk management under different economic and market conditions.

Keywords: Foreign Exchange, Financial Risks, Currency, Multinational Corporations

1. Introduction

We can clearly see that in recent years, the world economy has gradually become globalized, and trade between countries has deepened. Multinational corporations play a very important role in today's world economy. We have noticed that exchange rate fluctuations seem to have a strong correlation with the financial risks of multinational corporations. We attempt to seek a significant case from the past where multinational corporations were exposed to financial risks due to exchange rates and conduct research. Fortunately, we have found and studied this case, and we will elaborate on it in detail in the following text. At the same time, we will use the US dollar as the base currency and conduct regression analysis with the stock returns of multinational corporations based on the exchange rate changes between the US dollar and other major economic currencies.

1.1. Goals

This study explores the impact of the changes of exchange rate on the financial risks of multinational corporations, using the financial crisis suffered by Toyota in 2008 due to exchange rate fluctuations as a case study. The main purpose of this study is to analyse the specific impact of exchange rate changes on the risk of multinational corporations from multiple perspectives. By comparing data from Toyota and four other multinational corporations, we use regression analysis to identify and evaluate the relationship between exchange rate changes and multinational corporation risk. The study not only reviewed previous research by financial and economic scholars, but also analysed and reflected on them to find the connection between theory and practice. Through this method, we expect to gain a detailed understanding of the types of risks that businesses may face under different exchange rate changes and evaluate management strategies for these risks. The conclusion of this article will help deepen our understanding of the challenges and strategies that multinational corporations face in responding to exchange rate changes in a globalized economic environment, thereby providing practical guidance and strategic recommendations for financial risk management. In addition, the research findings may also reveal how companies enhance their financial stability and ability to sustain growth through effective risk management under different economic and market conditions.

1.2. Case study

The case we found is about Toyota, a Japanese car manufacturing company, facing serious financial risks during the 2008 financial crisis due to fluctuations in the exchange rate between the Japanese yen and the US dollar. In 2008 subprime crisis, the Japanese yen appreciated sharply against the US dollar and other major currencies, and Japanese government's monetary policy further strengthened the yen. In this situation, although Toyota has taken measures to respond, the company suffered a net loss of 350 billion yen from 2008 to 2009 and a net loss of 437 billion yen from 2009 to 2010, resulting in a decrease of 3 million yen in global automobile production.

This is a significant case about multinational corporations being affected by exchange rate fluctuations, leading to serious financial risks. And this case is still in a relatively sensitive economic period, namely the 2008 financial crisis. Special cases during special periods can help us analyse more possibilities and conclusions in the following comparative studies.

2. Literature review

In order to better complete our research and obtain more theoretical support, we have consulted a large amount of literature. We need a lot of research and literature on the financial risks caused by exchange rate fluctuations. These documents can provide us with more directions for thinking and theoretical foundations.

First, As I mentioned in the introduction, foreign exchange fluctuations are likely to bring significant financial risks to multinational corporations. The theoretical basis we can obtain from the literature is the professor Martin Glaum expressed the same view in his article “Highly volatile foreign exchange markets have forced corporate managers and academics alike to pay more attention to the management of foreign exchange risk.” [1]

The results of regression analysis may not be significant, which is a theoretical basis I have obtained after reading a large amount of literature. Different scholars and professors have concluded in their research that the relationship between exchange rate fluctuations and financial risks is not

significant. But the reasons they gave are basically consistent. The views expressed by the professor Faff and Marshall in their paper are highly recognized by me. “As predicted by theory, we find some evidence that MNCs with greater foreign operations have a larger magnitude of FX exposure. However, our proxy for the emphasis of FX management does not have the predicted negative association with the magnitude of FX, indicating that managers may focus on short-term cash flows in their FX management rather than firm value.” [2]

Professor Bartram and Bodnar’s viewpoint is also of great research value “Despite the low levels of significance, a large number of studies demonstrate that exchange rate exposures are related to measures of international business (primarily the percentage of foreign sales), firm size, firm liquidity, as well as industry sectors in a manner that is consistent with the predictions of financial theory.” [3]

2.1. Research question

The impact of exchange rate changes on the financial risk of multinational corporations, that is, whether the regression relationship between exchange rate changes and multinational corporation returns is significant. Is Toyota's case an isolated case or a broader financial issue.

2.2. Basic layout of research

Based on the information we obtained in the literature review, we plan to search for stock data of five multinational companies and the exchange rate changes between the domestic currency and the US dollar where the companies are located for regression analysis. We will compare the analysis results with the case content to obtain our conclusions.

However, before conducting regression analysis, we are not optimistic about the significance of the analysis results. This is because we believe that in today's international economic environment, multinational corporations have good hedging strategies to deal with financial risks that may arise from exchange rates, and at the same time, a relatively stable international economic environment will not produce significant exchange rate fluctuations. But all of this is still just our prediction, we need data research and analysis to verify our hypothesis.

3. Data analysis

$$Y_t = \alpha + \beta_1 X_t + \beta_2 Z_t + \epsilon_t$$

Figure 1. Financial model

Model explanation, Y_t is financial data (company stock return rate), X_t is exchange rate growth rate, and Z_t is control variable (such as company size, market index, etc.)

We selected five multinational corporations from around the world and conducted regression analysis using the US dollar as the base currency. We will use the stock returns of the target company over the past decade as the dependent variable, and the exchange rate growth rate between the US dollar and the major currencies in the target company's region as the independent variable for regression analysis.

To minimize the impact of settlement time on exchange rate and stock data, we chose to use the monthly average exchange rate growth rate and the company's monthly average stock return rate for regression analysis.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.752 ^a	.566	.559	.0462527

a. Predictors: (Constant), Nikkei225, Exchange4

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.326	2	.163	76.307	<.001 ^b
	Residual	.250	117	.002		
	Total	.577	119			

a. Dependent Variable: Toyota

b. Predictors: (Constant), Nikkei225, Exchange4

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.006	.004		-1.350	.180
	Exchange4	.459	.172	.175	2.671	.009
	Nikkei225	.991	.097	.670	10.243	<.001

a. Dependent Variable: Toyota

Figure 2. Toyota in Japan, and the regression analysis results 1

We can see that the regression analysis on Toyota Corporation presents significant results, indicating that there is a high possibility of financial risk for Toyota due to exchange rate growth rate.

But at the same time, let's focus on the other four companies, namely Lenovo, Samsung Electronics, Mercedes Benz, and Chevron.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.373 ^a	.139	.125	.0985004

a. Predictors: (Constant), HangSeng, Exchange1

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.184	2	.092	9.474	<.001 ^b
	Residual	1.135	117	.010		
	Total	1.319	119			

a. Dependent Variable: Lenovo

b. Predictors: (Constant), HangSeng, Exchange1

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.007	.009		.816	.416
	Exchange1	.384	5.587	.006	.069	.945
	HangSeng	.675	.160	.375	4.233	<.001

a. Dependent Variable: Lenovo

Figure 3. Regression analysis results of comparative data 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733 ^a	.537	.530	.0472985

a. Predictors: (Constant), KOSPI, Exchange3

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.304	2	.152	67.984	<.001 ^b
	Residual	.262	117	.002		
	Total	.566	119			

a. Dependent Variable: Samsung

b. Predictors: (Constant), KOSPI, Exchange3

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.008	.004		1.856	.066
	Exchange3	-.231	.194	-.085	-1.190	.236
	KOSPI	1.011	.104	.690	9.699	<.001

a. Dependent Variable: Samsung

Figure 4. Regression analysis results of comparative data 2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783 ^a	.613	.606	.0534093

a. Predictors: (Constant), Stoxx50, Exchange2

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.528	2	.264	92.516	<.001 ^b
	Residual	.334	117	.003		
	Total	.862	119			

a. Dependent Variable: Mercedes

b. Predictors: (Constant), Stoxx50, Exchange2

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.001	.005		-.251	.802
	Exchange2	-.229	.229	-.058	-.997	.321
	Stoxx50	1.375	.101	.787	13.596	<.001

a. Dependent Variable: Mercedes

Figure 5. Regression analysis results of comparative data 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.131 ^a	.017	.000	.0792339

a. Predictors: (Constant), DowJones, Exchange2

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.013	2	.006	1.016	.365 ^b
	Residual	.735	117	.006		
	Total	.747	119			

a. Dependent Variable: CHEVRON

b. Predictors: (Constant), DowJones, Exchange2

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.006	.007		.841	.402
	Exchange2	-.481	.354	-.130	-1.359	.177
	DowJones	.140	.173	.078	.811	.419

a. Dependent Variable: CHEVRON

Figure 6. Regression analysis results of comparative data 4

Our analysis results for these four companies are not significant. So why is this? Why is it that only Toyota in our case is prone to financial risks due to exchange rate growth rate, and wouldn't other companies be exposed to such risks.

Returning to some of the theoretical foundations we mentioned in the literature review section earlier, many scholars have obtained similar results when conducting research on topics related to ours, namely that the regression analysis between exchange rate changes and financial data shows insignificant results. Among the explanations provided by numerous scholars and professors, I believe that Professor Peter's explanation is more in line with my article and ideas. "One possible explanation for this insignificant impact is that exchange rates affect the rate of return on a multinational firm's stock through many channels that naturally offset each other. A second explanation is that firms use financial hedging strategies to mitigate losses due to the translation of foreign currency profits and assets into domestic currency prices." [4]

I fully agree with this explanation, and I fully agree that these large multinational companies have their own hedging strategies to mitigate the risks of foreign exchange volatility, especially after experiencing the 2008 finance crisis. At the same time, we need to pay attention to an important reason. The current world economic situation is relatively stable, and we have not been able to detect any major currency with significant fluctuations in exchange rate growth rate. Small scale exchange rate growth rate is almost negligible for multinational companies with good economic conditions to cause financial risks. The excellent economic environment and specially customized hedging strategies enable multinational corporations to effectively cope with financial risks that may arise from exchange rate fluctuations.

So why did Toyota, a Japanese company, not only suffer significant financial losses due to exchange rate growth rate during the 2008 economic crisis, but also have a high possibility of financial risks due to the impact of exchange rate growth rate in data analysis over the past decade. I believe that Japan's economic market is highly dependent on import and export business. Due to limited domestic resources in Japan, more economic activity comes from import and export business, with import and export trade with the United States being the most closely related. So the degree of connection between the Japanese yen and the US dollar may be closer compared to other major currencies, and the Japanese yen is also more susceptible to changes in the US dollar. And we know that Japan's rapid economic development at the end of the last century was closely related to the economic support of the United States, so Japan's finance and economy are closely linked to those of the United States. Toyota, as a large multinational corporation in Japan. It is a company that uses the Japanese yen as its base currency, but at the same time, Toyota's largest subsidiary is in the United States. It can be said that the exchange rate fluctuations between the Japanese yen and the US dollar are of great significance to Toyota's financial risk. So it is naturally affected by exchange rate growth rate and is more prone to financial risks. These pieces of evidence all prove that Japanese companies are indeed susceptible to the impact of exchange rate growth rate, leading to financial risks. This is related to Japan's domestic economic environment.

Another important reason is the impact of the 2008 financial crisis, which the professor Sikarwar has shown in his research "The findings of this study reveal the presence of significant exchange rate exposure in the full sample period of 2001–2016. There is a weak evidence of exposure in the pre-crisis period as opposed to the crisis and post-crisis periods. This suggests that the financial crisis of 2008 has strongly contributed to the overall strength of the exposure." [5]

The serious exchange rate risk brought about by the financial crisis was the reason why Toyota Company had significant financial risks at that time. This is also why multinational corporations nowadays pay more attention to the financial risks brought by exchange rate fluctuations. The tragic experience of the financial crisis has made company managers more emphasis on the important impact of exchange rates on economic markets and trade processes and deepened their concern and preparedness for exchange rate changes, even though the world's economic environment is gradually

globalizing. But for regions with relatively independent economic and trade, their tolerance to exchange rate changes is still high.

4. Conclusion

Overall, based on case studies and regression analysis, it has been found that in the current relatively stable economic environment, the likelihood of financial risks arising from exchange rate growth rate for most multinational corporations is relatively low. But in some specific regions, such as Japan; Or encountering special events, such as another economic crisis. The financial risks caused by exchange rate growth rate are still very likely. Although I believe that most multinational corporations in countries and regions have hedging plans to guard against the risks posed by exchange rate growth rate. However, we still need to note that in the context of economic globalization, the economic connections between countries are becoming increasingly close, and the possibility of financial risks caused by exchange rate growth rate may also gradually increase.

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