Foreign Exchange Rate Exposure of Multinational and Non-multinational Companies in China

Jijin Zhang

School of economics, Jinan University, Guangzhou, 510632, China

Abstract

We construct a sample of 1,114 Chinese listed companies from 2013 to 2019, and estimate the total and incremental foreign exchange exposures of each company by using intraday 30-minute high-frequency stock prices and bilateral exchange rate data of 11 countries and regions to renminbi (RMB), to obtain daily average foreign exchange exposures. We see positive foreign exchange exposure, with a weaker RMB pushing up the share prices of Chinese companies. And non-multinationals also have foreign exchange exposure, which is not statistically different from multinationals. In the study of dynamic exchange rate risk exposure, this paper finds that the sample has a trend of increasing year by year in the early stage, and may be affected by the China-US trade war. This indicates that the foreign exchange risk exposure of non-multinational companies is also worth paying attention to in the future. Both multinational companies and non-multinational enterprises should pay attention to strengthen the awareness of foreign exchange risk and build a risk prevention mechanism.

Keywords

Foreign exchange rate exposure; Multinational companies, Non-multinational companies; RMB exchange rate index.

1. INTRODUCTION

With China becoming the world's second largest economy, the Belt and Road Initiative and the continuous internationalization of the RMB, how much foreign exchange risk Chinese enterprises face has become a major question. To what extent are Chinese companies affected by currency fluctuations? The concept of foreign exchange risk exposure was first proposed by Adler and Dumas (1984). They define foreign exchange risk as the impact of exchange rate changes on a company's value.

Subsequent studies followed, but most of the current studies on foreign exchange risk exposure focus on multinational companies, ignoring the possible indirect impact of domestic companies. He and Ng (1998) believed that multinational companies were more susceptible to exchange rate risks than non- multinationals. Most scholars agree with this point of view and focus on transnational corporations. For example, Muller and Verschoor (2006) surveyed 817 European multinationals, Guo (2012) studied Chinese multinational corporations, Boudt et al. (2019) investigated American multinational corporations, in addition to Aggarwal and Harper (2010). They investigated the foreign exchange risk exposure of domestic companys in the US and proposed that there was no significant difference between the foreign exchange risk exposure of domestic companies and the risk exposure faced by multinational companies.

However, this paper not only focuses on multinational companies, but also includes non-multinational companies in the observation sample.This paper uses 30-minute intraday high-frequency stock price and exchange rate data to estimate total and incremental foreign exchange risk exposure, so as to better analyze the daily changes of corporate foreign exchange

risk exposure. We screened 1,114 Chinese listed companies from 2013 to 2019 and used two models to estimate each company's foreign exchange exposure and examine the average foreign exchange exposure of multinational companies and non-multinationals.We find that in fact non-multinational companies also have foreign exchange risk exposure, and there is no significant statistical difference from multinational companies. In the study of dynamic exchange rate risk exposure, this paper finds that the sample has a trend of increasing year by year in the early stage, and may be affected by the China-US trade war.This paper supplements the literature of non-multinational companies and has certain significance for foreign exchange risk management of enterprises.

2. METHODOLOGY

2.1. Estimating Foreign Exchange Rate Exposure

Referenced in Adler and Dumas (1984) and Jorion (1990), we measure total exchange rate exposure $\delta_{i,t}$ and incremental foreign exchange exposure $\gamma_{i,t}$.

$$S_{i,k,t} = \alpha_{i,t} + \delta_{i,t}EX_{k,t} + \epsilon_{i,t} \tag{1}$$

$S_{i,k,t}$ represents the logarithm of the return of the stock at the kth moment of t day, where k= 1..., K, we sample stock and exchange rate data every 30 minutes between 9:30 a.m. and 11:30 a.m.and13 :00 p.m. and 3:00 p.m.in Beijing time. $EX_{k,t}$ represents the logarithm of the return of the RMB exchange rate index compiled in the same time interval, and $\epsilon_{i,t}$ represents the error.

$$S_{i,k,t} = c_{i,t} + \beta_{i,t}S_{m,k,t} + \gamma_{i,t}EX_{k,t} + \varepsilon_{i,t} \tag{2}$$

$S_{m,k,t}$ takes the logarithm of the return of the CSI 300 index at the kth moment of t day, $\varepsilon_{i,t}$ represents the error.

The average foreign exchange exposure is calculated as follows :

$$\bar{\delta}_t = \frac{1}{I}\sum_{i=1}^{I} \hat{\delta}_{i,t} \tag{3}$$

Where i represents the number of samples, The total sample is 1114，sub-sample, the sample clock I is set to 458 and 656 respectively.

2.2. Estimating the RMB Exchange Rate Index

On the compilation of the RMB exchange rate index, this paper use bilateral trade weighting formulas (3)(Mei et al.,2011) and geometrically weighted average methods to compile the RMB exchange rate index.

$$\omega_{it} = \frac{I_t}{I_t+E_t} * \frac{I_{it}}{\sum_{i=1}^{m} I_{it}} + \frac{E_t}{I_t+E_t} * \frac{E_{it}}{\sum_{i=1}^{m} E_{it}} \tag{4}$$

ω_{it} represents the comprehensive weight of sample country i in year t, where i =1, 2... ,11, representing the United States, the Eurozone, Japan, Hong Kong, South Korea, Australia, Taiwan, Thailand, Singapore, the United Kingdom and Canada. $\frac{I_t}{I_t+E_t}$ represents the ratio of the import volume between sample country i and China to the total import volume of China in the current

period, $\frac{E_t}{I_t+E_t}$ represents the ratio of the import volume between sample country i and China to the total export volume of China in the current period, $\frac{I_{it}}{\sum_{i=1}^{m} I_{it}}$ and $\frac{E_{it}}{\sum_{i=1}^{m} E_{it}}$ are the weighted average of import weight and export weight of country i.

2.3. Data

The samples in this article are A-share companies listed on the Shanghai and Shenzhen Stock Exchanges, excluding financial companies, ST companies, and companies with missing or abnormal financial positions. Reference to Jorion(1990) and Guo Fei(2012), this article defined companies with active international transactions as multinational corporations with overseas business income accounting for more than 10% of total operating income. The full sample ewere divided into multinational and non-multinational companies. There were 656 non-multinational corporations and 458 multinational corporations. The 30-minute intraday high-frequency data of each company's stock price and the CSI 300 index were collected from the RESSET Financial Database.

By comparing the published by the bureau of statistics of China from 2013 to 2019, the amount of import and export trade and the actual amount of foreign direct investment, as well as the availability of sample data, this paper select a total of 11 countries and regions, including the United States, the Eurozone, Japan, Hong Kong, South Korea, Australia, Taiwan, Thailand, Singapore, the United Kingdom and Canada. The currency of the euro zone is the euro. Currently, there are 19 member countries. Data of the euro zone are combined according to the time when each member country joined.The exchange rate of the RMB against the sample currencies is collected from the Bloomberg Database, using the direct quotation method. And a rise in the index represents a depreciation of the RMB.

3. RESULTS AND DISCUSSION

3.1. Estimated Foreign Exchange Rate Exposures

This part is the analysis of the estimated results of foreign exchange risk exposure of Chinese listed companies. Table 1 shows the total foreign exchange exposure calculated by Model (1), including the full sample and a sub-sample of multinational and non-multinational companies. Table 2 shows the incremental foreign exchange exposure calculated by Model (2), including the full sample and a sub-sample of multinational and non-multinational companies.

Table 1. Total foreign exchange exposure

Variable	Mean	Std. Dev.	Min	Max
Full	0.31	6.29	-59.03	47.72
multinational companies	0.35	6.86	-55.93	48.09
non-multinational companies	0.28	6.42	-61.20	47.46

Table 2. Incremental foreign exchange exposure

Variable	Mean	Std. Dev.	Min	Max
Full	0.18	4.50	-33.56	39.36
multinational companies	0.24	5.42	-35.17	51.96
non-multinational companies	0.14	4.79	-33.34	40.17

It is clear that listed Chinese companies have positive exposure, both in full sample and sub-sample. For the whole market,if the RMB appreciates by1%, The average company's stock price increases by 0.31%.We can see that the RMB appreciates by1%, The company's stock price increases by 0.18%, after controlling the market rate of return and excluding the influence of variables that affect the company value but have nothing to do with the exchange rate, on average,

In terms of the sub-sample, our estimated average foreign exchange exposure is positive regardless of which model is used. Compared with the transnational sample and the non-transnational sample, the average risk exposure of multinational enterprises is slightly higher than that of non-multinational enterprises.In model (1), the transnational sample is 0.35 and the non-transnational sample is 0.28. In model (2), the transnational sample is 0.24 and the non-transnational sample is 0.14.

Therefore, in order to explore whether there are significant differences in average foreign exchange risk exposure between multinational samples and non-multinational samples, we conducted paired difference tests on the sub-samples of the two models respectively, and the results are shown in Table 3.

Table 3. Differences in foreign exchange exposure between multinational and non-multinational companies

difference	mean	t
model (1)	0.07	0.74
model (2)	0.10	0.90

As can be seen from Table 3, there is no significant difference between transnational enterprises and non-transnational enterprises in the two models. Non-multinational companies also have positive foreign exchange exposure.With the increasing globalization of financial and product markets, more and more domestic companies are exposed to foreign exchange risk. This risk exposure may come from competition between firms in the same industry, as well as from wholesalers who import foreign goods or distributors who export goods in the chain.

3.2. The Time Change of Foreign Exchange Exposure

Table 4. Differences in foreign exchange exposure between multinational and non-multinational companies

year	total_full	total_muliti	total_nonmuliti
2013	0.40	0.44	0.36
2014	0.36	0.52	0.25
2015	0.15	0.05	0.22
2016	0.87	1.01	0.78
2017	0.46	0.57	0.37
2018	0.32	0.35	0.29
2019	-0.40	-0.49	-0.33

Table 4 shows the time change of average total foreign exchange exposure estimated by model (1) from 2013 to 2019. We can find that the early foreign exchange risk exposure has a trend of increasing year by year except 2015. One speculation is that it may have something to

do with the massive crash in China's stock market in the second half of 2015. In 2019, there was negative exposure, which we suspect may be related to the trade war between China and US. The stock market rose sharply in the "broad credit" environment of policy easing and social finance exceeding expectations, while the RMB kept appreciating due to sino-US trade frictions.

4. CONCLUSION

We constructed a sample of 1,114 Chinese listed companies from 2013 to 2019 and estimated each company's total foreign exchange risk exposure and incremental foreign exchange risk exposure exposure to obtain cross-sectional foreign exchange exposures. We find that Chinese companies have positive foreign exchange exposure, and the depreciation of the RMB has pushed up Chinese companies' share prices. In the sub-sample test, this paper finds that non-multinational companies also have positive foreign exchange risk exposure, which is statistically no different from multinational companies. This indicates that the foreign exchange risk exposure of non-multinational companies is also worth paying attention to in the future. This also reminds us that not only multinational companies but also non-multinational enterprises should pay attention to strengthen the awareness of foreign exchange risk and build a risk prevention mechanism. By analyzing the average total exchange rate risk exposure of each group each year, we find that the positive exchange rate risk exposure in the early stage increases year by year, and the trade war may be the reason for the abnormal exchange rate risk exposure. This suggests that enterprises should use foreign exchange derivatives to hedge, control, transfer or hedge exchange rate volatility risks and deal with China-US economic and trade frictions.

REFERENCES

[1] Adler, M., & Dumas, B. (1984). Exposure to currency risk: definition and measurement. Financial management, 41-50.

[2] Aggarwal, R., & Harper, J. T. (2010). Foreign exchange exposure of "domestic" corporations. Journal of International Money and Finance, 29(8), 1619-1636.

[3] Boudt, K., Neely, C. J., Sercu, P., & Wauters, M. (2019). The response of multinationals' foreign exchange rate exposure to macroeconomic news. Journal of International Money and Finance, 94, 32-47.

[4] Fei Guo. (2012). Foreign Exchange Risk Hedging and Company Value: An Empirical Study Based on Chinese Multinational Corporations. Economic Research, (9), 18-31.

[5] He, J., & Ng, L. K. (1998). The foreign exchange exposure of Japanese multinational corporations. The Journal of Finance, 53(2), 733-753.

[6] Jorion, P. (1990). The exchange-rate exposure of US multinationals. Journal of business, 331-345.

[7] Mei Sheng, Ping Yuan &Hongbin Zhao. (2011). Study and reference of international experience in compiling effective exchange rate index. International Financial Studies, 9, 51-57.

[8] Muller, A., & Verschoor, W. F. (2006). European foreign exchange risk exposure. European Financial Management, 12(2), 195-220.