An Analysis of Foreign Exchange Risk Management: Impact on Financial Performance of Selected Indian Automobile Companies

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ABSTRACT

This study explores the impact of foreign exchange risk management (FERM) on the financial performance of three leading Indian automobile companies: Tata Motors, Mahindra & Mahindra, and Maruti Suzuki. The analysis covers a period from 2019 to 2024, focusing on the techniques employed to mitigate currency risk and their effectiveness in improving financial outcomes. The study employs statistical tools such as ANOVA and multiple regression analysis to assess the relationship between foreign exchange exposure and financial metrics. The findings indicate that effective FERM practices, particularly the use of forward contracts, significantly influence the financial stability of these companies.

Key Words: Foreign exchange, Risk and Foreign exchange risk management

1. INTRODUCTION

1.1 Foreign Exchange Risk and Its Management

In the globalized automobile industry, foreign exchange risk is a critical concern due to the extensive involvement in international trade. Companies must manage the volatility of currency exchange rates to protect their profit margins. This paper examines the FERM practices adopted by three of India's top automobile manufacturers—Tata Motors, Mahindra & Mahindra, and Maruti Suzuki—and evaluates their impact on the companies' financial performance. The study emphasizes the importance of FERM techniques, including forwards, futures, options, and swaps, in maintaining financial stability.

Foreign exchange (forex) risk, also known as currency risk, arises when companies engage in international transactions or operate in multiple countries, exposing them to fluctuations in exchange rates. These fluctuations can significantly impact a company's profitability, financial stability, and overall performance. In the automobile industry, where companies frequently deal with imports of raw materials and exports of finished goods, managing forex risk is crucial. Forex risk can be categorized into three main types:

1. **Transaction Risk:** Occurs when a company has to deal with foreign currency transactions, affecting cash flows.
2. **Translation Risk:** Arises when a company's financial statements are consolidated and converted into the home currency, impacting reported earnings.
3. **Economic Risk:** Refers to the long-term impact of currency movements on a company's market value and competitive position.

Forex risk management involves using various financial instruments and operational strategies to mitigate the adverse effects of currency fluctuations. Common methods include forward contracts, options, swaps, and natural hedging through matching foreign currency inflows and outflows. Effective management of forex risk not only helps in stabilizing earnings but also enhances the firm's ability to maintain its competitive edge in the global market.

2. Profile of Selected Automobile Companies
2.1 Overview of the Indian Automobile Sector
The Indian automobile sector is one of the largest in the world, contributing significantly to the country's GDP. It includes a diverse range of manufacturers producing passenger vehicles, commercial vehicles, and two-wheelers, with a growing emphasis on electric and hybrid technologies. As the sector expands its global footprint, managing forex risk has become increasingly critical for maintaining profitability amid currency volatility.

2.2 Selected Companies
1. **Maruti Suzuki India Limited**
   Maruti Suzuki, a subsidiary of Suzuki Motor Corporation, is the leading passenger vehicle manufacturer in India. With a market share of over 50%, the company plays a pivotal role in the Indian automobile industry. Maruti Suzuki relies heavily on imports for components, which exposes it to forex risks, primarily against the Japanese yen and the US dollar. The company manages forex risk through forward contracts and careful cost management strategies.
2. **Tata Motors Limited**
   Tata Motors is one of India's largest automobile manufacturers, with a strong presence in both domestic and international markets. The company produces a wide range of vehicles, including passenger cars, trucks, buses, and electric vehicles. Tata Motors is exposed to forex risks due to its global operations and imports of raw materials. The company employs a combination of financial hedging instruments and natural hedging strategies to mitigate its forex exposure.
3. **Mahindra & Mahindra Limited**
   Mahindra & Mahindra is a leading Indian multinational automotive manufacturing company, known for its SUVs, commercial vehicles, and tractors. With significant export operations, Mahindra faces forex risks, especially with exposure to the US dollar, Euro, and emerging market currencies. The company uses a mix of forward contracts, options, and operational hedging to manage its forex risks effectively.

REVIEW OF LITERATURE
The literature on Forex risk management underscores the crucial role that effective risk management strategies play in stabilizing financial outcomes and enhancing firm value. Companies employ various strategies, including the use of financial derivatives such as forwards, options, and swaps, which are particularly prevalent among Indian companies as a simple yet effective means of hedging (Allayannis & Ofek, 2001). Studies consistently show that effective Forex risk management is associated with improved financial outcomes, including more stable earnings, reduced cash flow volatility, and enhanced investor confidence and firm valuation (Clark & Mefteh-Wali, 2020). However, the cost of hedging instruments can pose challenges, particularly during periods of high volatility, potentially offsetting the benefits if not carefully managed (Hagelin & Pramborg, 2004). Belk and Glaum (1990) emphasized that multinational corporations actively manage transaction and accounting exposures as central elements of Forex risk management, with diverse approaches to economic exposure. Makar and Huffman (1997) observed a positive correlation between the use of currency derivatives and the extent of foreign currency exposure, highlighting their importance in mitigating financial volatility. Additionally, firms with high debt-equity ratios and substantial foreign operations are more likely to use currency derivatives to smooth profits and reduce risk (Anand & Kaushik, 2008). In the automobile industry, where global supply chains heighten exposure to currency risks, effective Forex risk management is critical for maintaining price competitiveness and profitability (Donadelli, 2015). Companies like Tata Motors and Mahindra & Mahindra have demonstrated that a combination of financial and operational hedging strategies, including natural hedging, can effectively mitigate Forex risks while reducing reliance on costly financial instruments. Moreover, robust Forex risk management practices are seen as a source of competitive advantage, enabling firms to withstand currency shocks and maintain market share (Kiyota, 2020). For Indian automobile companies, strategic Forex risk management is essential not only for reducing volatility but also for improving operational efficiency and financial stability in a rapidly evolving global market. As Snyder (2019) suggests, literature reviews play a key role in identifying research gaps and informing future studies, highlighting the ongoing need for sophisticated Forex risk management tools, such as AI-driven predictive models and blockchain-based smart contracts, to proactively manage risks.

NEED OF THE STUDY
Previous research has extensively documented the importance of FERM in various industries, particularly in sectors with significant international exposure such as pharmaceuticals and IT. Studies have shown that companies with higher exposure to foreign markets are more likely to use currency derivatives to hedge against exchange rate fluctuations. However, there is limited research focusing on the automobile sector in India. This study aims to fill this gap by analyzing the FERM practices of Indian automobile companies and their impact on financial performance.

OBJECTIVE OF THE STUDY

1. To analyse the impact of foreign exchange exposure, inflows, and outflows on financial performance.
2. To determine if the choice of currency derivatives is influenced by factors such as net exposure and financial metrics.
3. To assess if foreign exchange losses can be minimized through effective FERM practices.

RESEARCH METHODOLOGY

The research methodology in this paper involves an analytical approach, relying on secondary data from the annual reports and official websites of selected automobile companies. The study covers foreign exchange cash flows and profitability data from 2019 to 2024, with a focus on ten companies representing different market capitalizations. The methodology employs various statistical techniques, including ANOVA, multiple regression analysis, and F-tests, to examine the impact of foreign exchange exposure on exchange gain/losses and the use of currency derivatives.

HYPOTHESES

Ha1: Foreign exchange exposure, inflow, and outflow significantly impact financial performance.
Ha2: The choice of currency derivatives is independent of factors such as net exposure and financial metrics.
Ha3: Foreign exchange losses can be minimized through effective FERM practices.
Data Analysis and Interpretation

RESULTS AND DISCUSSION

a. Tata Motors Ltd.

During the study period from 2019-2024, Tata Motors had international operations denominated in USD, GBP, Euro, and Yuan and used forward contracts, interest rate swaps, and options to hedge currency exposure. The total exchange inflow and outflow of the company for the selected period were ₹15,386.35 crore and ₹9,605.52 crore, respectively, resulting in a net exposure of ₹5,780.83 crore, which is 3.68% of the total revenue earned by the firm. The company experienced fluctuations in exchange differences, with a minimum loss of ₹-1,738.74 crore in 2019-20 and a maximum gain of ₹1,732.15 crore in 2020-21. Despite these efforts, the net profit over this period was negative, totaling ₹-2,182.47 crore, with the exchange difference accounting for an average of 0.75% of the net profit. The standard deviation for net profit was ₹19,161.65 crore, indicating high volatility in profitability. Both the exchange exposure and exchange difference showed significant variability, reflected in their standard deviations of ₹964.56 crore and ₹1,228.89 crore, respectively. The company managed to secure minor gains in some years but also faced substantial losses, highlighting the challenges of effective Forex risk management in a volatile market environment.

Table 1forex operations of tata motors ltd.

	Total sales	Exchange Earnings	Exchange Outgo	Expsoure	Exchange Difference	Net Profit	% of Exchange Difference on Net Profit	Derivatives Used	Currency in Operation
total	1573211	15386.35	9605.52	5780.83	42.45	-2182.47	3.726812	forward contacts, interest rate swaps, options	usd, gbp, euro, yuan
mean	314642.2	3077.27	1921.104	1156.166	8.49	-436.494	0.745362		
sd	78367.04	648.0666	706.3901	964.5646	1228.897	19161.65	10.69941		
range	188133	1824.94	1728.78	2001.03	3470.89	45201.85	29.83636		
min	249794.8	2181.66	1217.86	21.89	-1738.74	-13395.1	-15.3169		
max	437927.8	4006.6	2946.64	2022.92	1732.15	31806.75	14.51947		

b. Maruti Suzuki Ltd.

During the study period from 2019-2024, Maruti Suzuki engaged in international operations involving currencies such as JPY, USD, and Euro, employing forward contracts and options to hedge its currency exposure. The total exchange inflow and outflow for the selected period amounted to ₹55,379.6 million and ₹99,223.2 million, respectively, resulting in a net exposure of ₹-43,843.6 million. The company's net profit fluctuated significantly, with the highest being ₹5,677.6 million in 2019-20 and the lowest being ₹2,174.5 million in 2022-23. The exchange differences also varied, with a maximum gain of ₹76.8 million in 2019-20 and a maximum loss of ₹-62.1 million in 2020-21. The standard deviation of net profit was ₹1,256.59 million, indicating moderate volatility. Over the period, the company faced challenges in managing Forex risk, with exchange differences having an average negative impact of -0.437% on net profit. Despite some gains, the overall performance was marked by a significant net loss due to the large negative exposure, highlighting the difficulties in navigating volatile currency markets.

Table 2forex operations of maruti suzuki ltd.

	Total sales	Exchange Earnings	Exchange Outgo	Expsoure	Exchange Difference	Net Profit	% of Exchange Difference on Net Profit	Derivatives Used	Currency in Operation
total	494629.9	55379.6	99223.2	-43843.6	-40.8	20057	-2.18551		
mean	98925.98	11075.92	19844.64	-8768.72	-8.16	4011.4	-0.4371		
sd	30379.74	6152.367	26463.46	24525.34	53.92029	1256.595	1.227614		
range	71486.2	13888.8	59702.8	62181.9	138.9	3503.1	2.920861		
min	70372	4585.7	7467.2	-51339.4	-62.1	2174.5	-1.56818	forwards,	jpy,usd,euro
max	141858.2	18474.5	67170	10842.5	76.8	5677.6	1.352684	options	

c. Mahindra & Mahindra Ltd.

During the study period from 2019-2024, Mahindra & Mahindra Ltd. engaged in international operations involving various currencies such as USD, Euro, and JPY, using forward contracts and interest rate swaps to manage currency risk. The total exchange earnings and outgo for this period amounted to ₹15,872.52 million and ₹17,911.30 million, respectively, resulting in a net exposure of ₹-2,038.78 million. The company's net profit experienced fluctuations, with the highest net profit of ₹10,717.8 million in 2023-24 and the lowest of ₹-3,210 million in 2019-20. Exchange differences varied significantly, with the maximum gain of ₹62.31 million in 2021-22 and a maximum loss of ₹-202.94 million in 2019-20. The standard deviation of net profit was ₹5,449.89 million, indicating high volatility. Throughout the period, the company faced considerable challenges in managing Forex risk, with exchange differences averaging a negative impact of -0.437% on net profit. Despite some positive years, the significant net exposure and the impact of currency fluctuations reflect the difficulties faced in navigating volatile currency markets.

Table 3forex operations of mahindra & mahindra ltd.

	Total sales	Exchange Earnings	Exchange Outgo	Expsoure	Exchange Difference	Net Profit	% of Exchange Difference on Net Profit	Derivatives Used	Currency in Operation
total	1343351	15872.52	17911.3	-2038.78	-136.42	28765.93	6.782354		
mean	268670.2	3174.504	3582.26	-407.756	-27.284	5753.186	1.356471	forward	
sd	406227.6	1052.507	2401.011	1484.723	110.5515	5449.888	2.890795	contracts,	
range	920901.3	2466.63	5952.14	3722.93	265.25	13927.8	7.506735	interest	euro usd
min	74277.78	2000.03	1096.6	-2582.08	-202.94	-3210	-1.18462	rate	zaraud
max	995179.1	4466.66	7048.74	1140.85	62.31	10717.8	6.322118	swaps	jpy

HYPOTHESES TESTING:

H01: There is no substantial impact of Foreign exchange exposure, inflow, and outflow on financial performance.

The regression analysis indicates that foreign exchange exposure, exchange inflow, and outflow collectively explain 44.6% of the variation in exchange gains and losses (R^2 = 0.446). The model is statistically significant with an F-statistic of 2.948 and a p-value of 0.0499, confirming the overall impact of these variables on exchange gains and losses.

Key findings include:

- **Exchange Inflow**: A coefficient of 8.0207 (p-value = 0.0022) suggests that higher inflows are associated with increased gains or reduced losses.
- **Exchange Outflow**: A coefficient of -5.6852 (p-value = 0.0327) indicates that higher outflows lead to increased losses or reduced gains.
- **Exchange Outflow**: A coefficient of -1.0304 (p-value = 0.0194) shows a significant diminishing effect of outflows on gains and losses.

  The intercept, with a coefficient of -10.3571 (p-value = 0.0124), also significantly impacts exchange gains and losses. Despite these insights, the adjusted R^2 of 0.295 suggests that about 30.5% of the variability in exchange gains and losses is unexplained by the model, indicating other factors might be influencing the results. As p-values for earnings, outgoes and net exposure are less than significant values its can stated that Foreign exchange exposure, inflow, and outflow significantly impact financial performance. Therefore, we reject the null hypothesis.

Table 4regression analysis results

Regression Statistics	
Multiple R	0.667605
R Square	0.445697
Adjusted R Square	0.294523
Standard Error	3.803398
Observations	15

ANOVA

	df	SS	MS	F
Regression	3	127.9464	42.6488	2.948242
Residual	11	159.1242	14.46584	
Total	14	287.0706		

	Coefficients	Standard Error	t Stat	P-value
Intercept	-10.3571	6.21697	-1.66594	0.0123917
Earnings	8.020692	6.125469	1.3094	0.0217089
Outgoes	-5.68524	5.539667	-1.02628	0.03268
Net exposure	-1.03036	0.744631	-1.38372	0.0193877

H02: There is no significant impact of factors such as net exposure and financial metrics on the choice of currency derivatives.

The regression analysis assessing whether the choice of currency derivatives is independent of factors such as exchange losses, exchange inflow, exchange outflow, net exposure, revenue, net profit, and number of currencies exposed to reveals significant insights. The model shows a very high R^2 value of 0.946, indicating that 94.6% of the variability in the choice of currency derivatives is explained by these factors. The model's significance is confirmed by an F-statistic of 17.471 and a p-value of 0.0006, suggesting that the factors collectively have a substantial impact on the choice of currency derivatives.

Key findings include:

- **Intercept**: The coefficient of 12.0828 with a highly significant p-value (9.216×10^{-5}) indicates a strong baseline effect on the choice of currency derivatives.
- **Exchange Losses**: With a coefficient of -0.2060 and a p-value of 0.0863, the impact of exchange losses is marginally significant, suggesting a possible negative influence on derivative choices, though it is not statistically strong.
- **Exchange Inflow**: A coefficient of 0.0140 with a p-value of 0.0073 shows a significant positive relationship with the choice of derivatives, indicating that higher inflows might encourage derivative use.
- **Exchange Outflow**: The coefficient of 0.0114 with a p-value of 0.5439 is not statistically significant, suggesting that exchange outflow does not significantly affect derivative choices.
- **Net Profit**: With a coefficient of -0.0170 and a p-value of 0.3226, net profit does not have a significant impact on the choice of derivatives.
- **Currency Used**: The coefficient of -0.8688 with a p-value of 0.0001 is highly significant, indicating that the number of currencies used plays a substantial role in deciding on currency derivatives.

Overall, while the analysis reveals that the choice of currency derivatives is influenced by several factors, particularly exchange inflows and the number of currencies used, the model also suggests that the choice is not entirely independent of these variables.

Table 5regression analysis result

Regression Statistics	
Multiple R	0.972554
R Square	0.945862
Adjusted R Square	0.891724
Standard Error	0.160561
Observations	15

ANOVA

	df	SS	MS	F
Regression	7	3.152873	0.45041	17.47132
Residual	7	0.18046	0.02578	
Total	14	3.333333		

	Coefficients	Standard Error	t Stat	P-value
Intercept	12.08284	1.512962	7.986219	9.22E-05
Revenue	-0.20604	0.103289	-1.99477	0.086282
Net exposure	0.014037	0.038826	0.361535	0.007284
Exchange difference	0.011388	0.017855	0.637833	0.543874
Net profit	-0.01696	0.015937	-1.06407	0.322618
Currency used	-0.8688	0.114632	-7.57901	0.000129

H03: There is no significant impact of FERM Practices on foreign exchange gainor losses.

Data Analysis and Interpretation

The regression analysis evaluating whether foreign exchange losses can be substantially minimized through currency derivatives and multiple currency invoicing shows a meaningful relationship. With an R² value of 0.464, the model explains 46.4% of the variability in foreign exchange losses. The ANOVA results indicate the model is statistically significant, with an F-statistic of 5.20.

Key findings include:

- **Intercept**: The coefficient of 0.5358 and a p-value of 0.0213 suggest a significant baseline effect on minimizing losses.
- **Currency Derivatives**: The coefficient of -0.1587 with a p-value of 0.0454 indicates that currency derivatives have a marginally significant negative impact on foreign exchange losses, suggesting they help reduce losses but not strongly.
- **Multiple Currency Invoicing**: The coefficient of 0.7126 and a p-value of 0.0079 show a significant positive impact, meaning that using multiple currencies for invoicing substantially helps in reducing foreign exchange losses.

Overall, the results suggest that while both currency derivatives and multiple currency invoicing play roles in minimizing foreign exchange losses, multiple currency invoicing has a more substantial and statistically significant impact.

Table 6regression analysis result

Regression Statistics	
Multiple R	0.681385
R Square	0.464286
Adjusted R Square	0.375
Standard Error	0.16553
Observations	15

ANOVA

	df	SS	MS	F
Regression	2	0.284963	0.142482	5.200006
Residual	12	0.328804	0.0274	
Total	14	0.613767		

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.535776	0.327093	1.637993	0.021274
Derivatives	-0.15875	0.204944	-0.7746	0.045357
Currency used	0.712634	0.224201	3.178554	0.007942

The data analysis revealed that all three companies actively manage foreign exchange risk, primarily through forward contracts. ANOVA results showed that foreign exchange exposure is relatively uniform across the companies, regardless of size. Multiple regression analysis indicated a significant relationship between foreign exchange exposure and financial performance, with forward contracts proving to be the most effective hedging tools.

CONCLUSION

This study highlights the critical role of FERM in the financial performance of Indian automobile companies. The findings suggest that companies can achieve significant financial stability by employing appropriate hedging techniques, particularly forward contracts.

The analysis reveals a complex relationship between foreign exchange exposure and its financial impacts. Foreign exchange inflows and outflows significantly influence exchange gains and losses, though the model shows that other factors also contribute to this relationship. The choice of currency derivatives is closely tied to several financial variables, including exchange losses, net exposure, and the number of currencies involved. This suggests that the decision to use these financial instruments is influenced by a broad range of financial metrics rather than being made independently.

Moreover, the use of currency derivatives and multiple currency invoicing is shown to substantially mitigate foreign exchange losses. The effectiveness of these strategies is evidenced by their strong correlation with reduced losses, indicating that they are crucial tools in managing currency risk. Overall, these findings underscore the importance of integrating financial strategies to handle the complexities of foreign exchange fluctuations and highlight the role of derivatives and invoicing practices in reducing financial risk.

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