**Proceedings of GLOGIFT 17**
December 11-13, 2017
Delhi School of Management, Delhi Technological University, Delhi
pp. 144-168

# Foreign Exchange Risk Management by Companies: A Systematic Literature Review

**Archana Singh[1] and Varuna[2]**

**Abstract**

*This paper studies a broad range of research and highlights the main findings of the literature regarding the foreign exchange or currency risk management by different companies. More specifically the study finds various ways in which a company manages this exposure and observes the most popular method for the same. The paper also reviews and discusses important aspects of forex risk management that a company should scrutinize for formulating an effective strategy. Further, the paper brings out the practices and methods followed by companies to manage the foreign exchange exposure with the focus on the structural and the strategic change that has come in the company practices over the years for the currency risk management. The paper concludes by laying out the future direction for research in this area.*

***Keywords:*** Foreign Exchange, Companies, Risk Management, Strategy.

## Introduction

Internationalization of the companies, integration of the financial markets, themobility of people, goods and services across borders, in short globalization, has exposed companies to numerous risks.Foreign exchange risk is one of the most prominent risk where the movement in the currency exchange rate impacts the financial performance and the value of the company (Choi and Prasad 1994, Chow & Chen 1998, Bradley & Moles 2001, Kiymaz 2003, El-Masry et al. 2007, Bartram 2008, Wei and Starks 2013).It,thereforebecome extremely important for the companies to manage this risk.There are various ways in which the companies manage this exposure. Some companies formulate a centralized strategy for the forex risk management where the risk is managed for all subsidiaries and sister companies from a centralized unit(Stanley & Block 1980, Collier & Davis 1985).Few companies use operational hedges like using foreign debt, geographic diversification of business, operations in multiple currencies, etc. to manage the currency risk. (Chowdhry & Howe 1999, Allayannis & Ofek 2001, Hagelin & Pramborg 2004), few companies use financial hedges like currency derivatives to manage this exposure (Duangploy 1997, Chowdhry & Howe 1999, Marshall 2000, Kim et al. 2006, Fornés & Cardoza 2009) while some integrate both operational and financial hedging strategies to manage the currency risk (Kim et al. 2006, Bartram & Bodnar 2007, Faseruk and Mishra 2008, Chong et al. 2014).

Broadly foreign exchange exposure is classified as transaction, translation and economic exposure. Transaction exposure is the cash flow variability faced by the companies because of time delay

1. Assistant Professor, Delhi School of Management, Delhi Technological University
2. Ph.D. Scholar, Delhi School of Management, Delhi Technological University

in the entry and settlement of the contract. This risk rises with the rise in the time delay of the settlement of the transaction.Translation risk is the balance sheet risk which arises when a multinational company consolidates its financial statements and value all the assets and liabilities of the subsidiaries in its home currency. Economic exposure measures the impact of the exchange rate variability on the future cash flows of the company, and it is relatively difficult to measure this exposure.Majority of the firms manage the transaction and translation exposure (Collier et al. 1992, Marshall 2000, Aabo 2001, Nguyen & Faff 2003, Clark & Judge 2009, Chong et al. 2014).

The literature is filled with various research papers that study the foreign exchange risk management by companies. Such papers are varied, and each paper studies a different aspect of this topic.Further, the foreign exchangerisk management is an important aspect of business operations which is gaining considerable importance over the years. With this background, there are two motivations behind this research. First, with the availability of such vast literature on the topic,there is a need to bring a thoroughness to the literature review which serves as a means for making sense out of the findings of the collection of the studies. This paper is one of the first such attempts for the topic under study. Second, with the development and integration of the foreign exchange markets the world over, the risk of exchange rate fluctuations has increasedeven for the companies which do not have foreign operations. The regulatory bodies are also taking notice of this change and coming up with various policies to make the management of foreign exchange risk easier for the companies.The present study,therefore, undertakes an extensive systematic review of the available literature to understand what the collection of the studies are saying.

## Method and Research Scope

The systematic research is carried out as per the basic guidelineslaid down by the Tranfield, Deyner, and Smart (2003) for carrying out such a review in the field of management. They laid down three stages for carrying out such a review:

Stage I: Planning the review

Stage II: Conducting the review

Stage III: Reporting and Dissemination

The stage I includes identifying the need for review and preparing a proposal followed by developing a review protocol. The section one (01) of the present paper fulfills the criteria for identifying the need for review and proposal preparation. Stage II involves identifying research, selecting studies, assessing quality, extracting data and synthesis. Stage III is reporting and recommendation (Tranfield et al. 2003).

### Developing Protocol

### Identifying Research Papers

To identify the relevant research papers under the mentioned topic, a broad search of relevant keywords was undertakenon six social science database Emerald, Elsevier, Jstor, Springer, SSRN and Wiley Online Library. Since theacademic database is often constraint by the keyword used, journals included,etc.; relevant searches were also conducted on Google Scholar to identify pertinent research papers.

For primary inclusion,the title, keyword or abstract of an article had to contain a combination of four groups of keywords. The first group addressed"foreign exposure management"which was

fulfilled using the phrases: “currency risk”and “foreign exposure management” and “FX exposure management”. The second group addressed “companies” which was fulfilled using the phrases: “non-financial companies” and “firms” and “corporates” and “organizations”. The third group addressed “strategies” for managing this exposure as adopted by the companies which was fulfilled using phrases “operational hedging strategies” and”financial hedging strategies” and “determinants of FX/ forex/ currency exposure management”. The fourth group addressed “Regulation of forex risk management” which was fulfilled using phrases: “Guidelines for forex risk management” and “Accounting for forex risk management”.

**Inclusion Criteria**

It includes a set of rules that an article must meet tobe included in the analysis. Thus, all the papers that were identified through the keyword search were included in the analysis only if they met the following criteria:

1. Journal Quality Threshold: The papers were taken from peer-reviewed journals which guarantee minimum quality if relevant studies.
2. English language: Full text of the article must be present in an electronic format and should be in the English language which adds to the replicability and transparency of the review.
3. Scanning for fit: The articles were scanned for their fit with the specific topic of theliterature review. First, the articles were screened by the title, then by abstract and finally each research paper was read, and a thorough examination of the article was done from the perspective of the theme of the study.

   During this stage, thefull text of the article was read and analyzed, and finally,73 articles were selected for the study.
4. Reference papers: References of all the selected papers were scanned to identify further relevant articles, and finally, the number was increased to 75

   The table I shows the details of articles found from different database.

**Table I: Selection of Studies**

| Source | Selected Studies |
|---|---|
| Emerald | 20 |
| Elsevier | 22 |
| Google Scholar | 2 |
| JStor | 8 |
| Springer | 3 |
| SSRN | 2 |
| Wiley | 16 |
| from Reference | 2 |

**Exclusion Criteria**

Books, Ph.D. Thesis, technical reports, working papers and articles published in conference proceedings were excluded to maintain the quality of the systematic literature review. Further

articles which focused on general hedging in themarket, currency investment portfolios, derivative usage in financial market and studied risk in general or combined foreign exchange risk with other risk were also excluded.

## Review Findings

As a first step, the articles were classified into various categories like context, region, study type, objective, topics approached and results and implications. Table II shows the sorting of each research paper into different categories.

**Table II: Classification Index**

| S.No. | Categories | Sub-Categories |
|---|---|---|
| 1 | Context | A - Developing Economies<br>B - Developed Economies<br>C - Not Applicable |
| 2 | Region | A - USA & Canada<br>B – Europe<br>C – Asia<br>D - Emerging Markets<br>E - Australia and New Zealand<br>F - Other Countries<br>G - Not Applicable |
| 3 | Study Type | A – Descriptive<br>B – Empirical<br>C – Survey<br>D – Other |
| 4 | Objective | A - FX risk faced by companies / industry<br>B - Determinants of FX risk<br>C - Effect of exchange rate movements on cashflow, stock return and value of firm<br>D - FX risk management strategies<br>E - Hedging or using of derivatives for FX risk management<br>F - Effectiveness of foreign exchange exposure hedging<br>G - Financial model and foreign exchange risk management<br>H - Accounting for the FX exposure hedging<br>I - The forex market and exposure management |
| 5 | Topics Approached | A - Foreign exchange rate exposure of the firm/industry<br>B - Management of different types of foreign exchange expos ure<br>C - Foreign exchange exposure management linked to firm-specific characteristics<br>D - Foreign exchange exposure and value of firm<br>E - Foreign exchange risk management strategies - Operational and Financial<br>F - Use of Financial instruments for foreign exchange risk management<br>G - Hedging the foreign exchange risk and effectiveness of hedging<br>H - Regulatory Guidelines for derivatives hedging<br>I - Financial Models for foreign exchange risk management<br>J - Foreign exchange market and exposure management<br>K - Speculation and foreign exchange risk management |
| 6 | Results and Implications | A - Consistent with previous literature<br>B - Existing model different data<br>C - Guidelines for implementation<br>D - Enhances the literature |

**Classification Index of Articles**

There are six major categories numbered one (01) to six (06). These categories are further sub-categorized and coded by letters (as shown in Table II). Each paper is classified in these categories and each paper was assigned different codes depending on the scope of thepaper.

The first category is 'Context'which is an important category which helps us in determining the places where such studies are most conducted.The further sub-categories are coded as A, B, C where A represents DevelopingEconomies, B represents Developed Economies and C is Not Applicable.Next, the articles are further categorized as per the 'Region' where the articles are further categorizedas per the geographic region where the study is undertaken. Thisenables us to identify the countries of research. The further classificationunder this category are coded from A to G where A represents USA & Canada, B represents Europe, C represents Asia, D represents Emerging Markets, E represents Australia and New Zealand, F represents Other Countries, and G represents Not Applicable.

Next, the articles are classified as per the 'Study Type'.This category classifies papers as per the type of study undertaken. Here the sub-categories are coded from A to D, where A representsdescriptive study, B representsempirical study, C representssurvey methodfor the study andD representsothermethod of research. 'Objective' is the next category where the articles are classifiedon the basis of the expanded objective of each research paper. Further, to understand the broad topics of discussion of the articles, the main topics are identified and are classified and coded from A to K under the main heading 'Topics Approached'.Finally, results and implications of each articleare classified incategory 'Results and Implications'.

**Classification of Articles**

Each articleis organized in the above-mentioned categories. Table III provides the detailed classification of each paper in all the categories described above.

**Table III: Classification of Articles**

| S.No. | Year of Study | Context | Region | Study Type | Objective | Topics Approached | Results and Implication | Cite Score |
|---|---|---|---|---|---|---|---|---|
| 1 | 1980 | B | A | C | A, D, G | A, E, F | C, D | 7 |
| 2 | 1983 | C | G | A | A, E | A, F, G | A, C, D | 176 |
| 3 | 1985 | B | B | C | A, B | A, B, C, E | B, D | 50 |
| 4 | 1990 | B | A | B | A | A, B, C | A, B, D | 120 |
| 5 | 1990 | B | A | B | A, C | A, C, D | B, C, D | 1495 |
| 6 | 1992 | B | A, B | D | A, D | A, B, E | A, B, D | 10 |
| 7 | 1993 | A, B | A, B, C | B | A | A | B | 841 |
| 8 | 1994 | B | A | B | C | D | B, D | 920 |
| 9 | 1994 | B | E | B | A, C | A, D | B, D | 174 |
| 10 | 1995 | B | A | B | B, C | A, C, D | B, D | 472 |
| 11 | 1997 | B | A | C | A, D, H | A, B, E, I | A, C, D | 11 |
| 12 | 1997 | C | G | A | A | A, B | A, D | 21 |
| 13 | 1997 | B | A | B | A, B, C | A, B, E, F, G | A, D | 231 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 14 | 1997 | B | G | A, B, C | E | F, G | B, D | 1395 |
| 15 | 1998 | B | C | B | B, C, E | A, C, D, F | A, B, D | 128 |
| 16 | 1998 | B | C | B | C | A, C | B, D | 679 |
| 17 | 1998 | B | A | B | A | A, B, C | A, B, D | 204 |
| 18 | 1999 | C | G | B | D, E | E, F | A, B, D | 146 |
| 19 | 1999 | B | A | B | A, D | A, C, D, F | A, B, D | 59 |
| 20 | 2000 | B | G | A | H | H | C, D | 9 |
| 21 | 2000 | C | G | B | G | F, G, I | B, D | 55 |
| 22 | 2000 | A | C, D | B | A, B, I | A, C, D, J | A, B, D | 26 |
| 23 | 2000 | A, B | A, B, C | C | A, B | A, B, E, F | A, B, D | 135 |
| 24 | 2000 | B | B | C | A, B | E, F, G, J | A, D | 31 |
| 25 | 2001 | B | A | B | D, E | D, E F, G | B, C, D | 313 |
| 26 | 2001 | B | A | B | D, E, F | E, F, G | A, B, D | 1011 |
| 27 | 2001 | B | A | B | D, E, F | D, E, F | A, B, D | 1057 |
| 28 | 2001 | B | B | C | A | B, C, D, E | A, C, D | 30 |
| 29 | 2001 | B | B | B | D | E | B, D | 120 |
| 30 | 2001 | B | B | A, B, C | D | B, C, E | A, B, D | 16 |
| 31 | 2001 | B | A, C | B | C, D | A, C, D | A, B, D | 342 |
| 32 | 2001 | B | A | B | D | A, E | A, B, D | 249 |
| 33 | 2001 | B | A | B | D, E, F | E, F, G | C, D | 341 |
| 34 | 2002 | B | G | A | H | H | C, D | 1 |
| 35 | 2002 | B | A, B | C | A | A, E | A, D | 16 |
| 36 | 2002 | B | A | B | C | A, D | A, D | 17 |
| 37 | 2002 | B | A | B | C | A, D | A, D | 48 |
| 38 | 2003 | B | A | B | G | I | A, B, D | 313 |
| 39 | 2003 | B | A | B | A, C | A, C, D | A, B, D | 46 |
| 40 | 2003 | B | C | B | C | A, C, D | A, B, D | 79 |
| 41 | 2003 | B | B | A, B, C | E | B, D, F | A, B, D | 133 |
| 42 | 2003 | A | C, D | B | A | A, D | B, D | 126 |
| 43 | 2003 | B | E | B | E | B, E, F, G | A, B, D | 94 |
| 44 | 2004 | B | B | B | A | A, B, C, E, F | A, C, D | 163 |
| 45 | 2004 | B | B | A, B, C | E, F | B, D, E | A, B, D | 141 |
| 46 | 2005 | A, B | A, B, C | B, C | B | C, D, E | A, D | 41 |
| 47 | 2005 | B | C | B | C | A, C | A, B, D | 17 |
| 48 | 2005 | B | A | D | C | E, F | A, D | 34 |
| 49 | 2005 | C | G | A | A, D, E | B, D, E F | A, D | 50 |
| 50 | 2006 | B | B | B | B, C | B | A, B, C | 43 |
| 51 | 2006 | B | B | B | D | C, E | A, B, D | 42 |
| 52 | 2006 | A | C, D | B | A, B | A, C, E | A, B, D | 10 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 53 | 2006 | B | B | B | B, C, D | A, C, E, F | A, B, D | 76 |
| 54 | 2006 | B | A | B, C | C, D | B, E, F | A, B, D | 167 |
| 55 | 2006 | C | G | B | A, C, D | A, C, D, E | A, B, D | 182 |
| 56 | 2006 | B | B | B | C, D, E | A, D, E, F | A, B, D | 35 |
| 57 | 2006 | B | B | B | A | A, C, D, E | A, B, D | 43 |
| 58 | 2006 | B | A | B | A | A, C, D | A, B, D | 74 |
| 59 | 2007 | B | B | B | B, C | C,E, F, G | A,B | 43 |
| 60 | 2007 | B | A | B, C | A | A, E | A, D, D | 143 |
| 61 | 2007 | B | B | B | B, C | A, C | A, B | 26 |
| 62 | 2007 | B | A | B | A | A, C, D, E | A, B, D | 25 |
| 63 | 2008 | B | A | B | C | E, G | A, D | 12 |
| 64 | 2008 | C | G | B | A, D | E, F | A, B, D | 113 |
| 65 | 2009 | A | C, D | A, C | B, C | B, C, D, E | A, D | 7 |
| 66 | 2009 | A | F, D | A, B, C | C, D, E | C, E, G, I | A, D | 23 |
| 67 | 2009 | B | B | B | D, E | B, E, F, G, H | A, B, C, D | 65 |
| 68 | 2010 | B | G | B | A, C, D | A, C, D, H | B, C, D | 54 |
| 69 | 2011 | A | C, D | B | E | C, E, F, G | B, D | 22 |
| 70 | 2012 | B | B | B, C | D | E, F, K | A, D | 10 |
| 71 | 2013 | B | A | B | A, B | A, C, D | A, D | 19 |
| 72 | 2013 | B | B | B | B, F, H | F, G, H | A, D | 19 |
| 73 | 2013 | B | B | B | B | A, C, D, F | A, D | 18 |
| 74 | 2014 | A | C, D | A, B, C | E | C, E, F, G, | A, C, D | 10 |

Most of the studies about 76 percent focused on the developed countries. Very few about 9 percent only focused on only developing economies.This shows that foreign exchange risk management by the companies has been exhaustively studied in the developed markets whereas there is a lot of scope to study the forex risk management by companies in developing economies. Further, it was only after the year 2000 that the research started focusing on the emerging economies.Out of the studies that met the inclusion criteria of the paper, more than 60 percent of the studies focused on US, Canada, and Europe area. Only 13 percent of the studies focused exclusively on Asia and out of these only nine percent researched emerging markets. There is clearly a gap in the studies conducted.

Majority of the studies, approximately 67 percent, used empirical method for their research where majorly the researchers used regression analysis. Approximately 15 percent of the studies used the combination of either two or three different statistical methods.

The objective of each of the articles is broken into nine simpler categories.Majority of the studies primarily focused on foreign exchange risk as faced by companies, identifying determinants of this risk, measuring the effects of exchange rates on different financial parameters like cash flows, stock return and overall value of the firm, studying the management strategies for containing this risk and evaluating hedging or use of derivatives for FX risk management.Very few studies, approximately six percent, evaluate the effectiveness of hedging the risk, and only three percent study the financial models or accounting requirement for forex risk management. It is surprising to note that only one article studies the forex market.

The main topics in the articles are also analyzed, and important subjects approached in each article is identified. Major subjects which majority of these articles discuss are different types foreign exchange rate exposure faced by the firm, impact of foreign exchange fluctuation on firm-specific characteristics, impact of these fluctuations on the value of the firm, operational strategies for management of forex exposure, financial strategies, that is, use of financial instruments for hedging the risk. Approximately 50 percent of the articles discuss the strategies for managing the forex risk and 40 percent talk about theimportance and use of financial instruments for hedging the risk, but only 21 percent discuss the effectiveness of hedges undertaken. Moreover, important subjects like regulatory guidelines for hedging, use of financial models for evaluating risk management and study of the foreign exchange market are not given due importance and are hardly discussed in these articles.

Almost all the studies are consistent with the existing literature and provide guidelines for implementation and enhance the literature. The empirical studies, use the already existing models for data analysis.

**Main findings of the articles**

Table IV presents the cluster of findings of the articles under study.

**Table IV: Cluster Findings of Articles**

| Cluster of Findings | Sub-Clusters | Main Findings |
|---|---|---|
| Reasons for Managing Foreign Exchange Risk | Relevance of the currency risk management for companies/ industry | Market imperfections like incomplete securities market, positive transaction and information cost, agency cost, etc. make it necessary for the companies to manage the forex risk (Dufey&Srinivasulu 1983).<br>The impact of exchange rate movement on industry return is larger for internationally oriented economies (Bodnar & Gentry 1993).<br>Japanese firms are adversely affected by yen depreciation (Chow & Chen 1998).<br>Textile, machinery, chemical and financial industries on Turkeyare highly exposed to foreign exchange fluctuations(Kiymaz 2003).<br>Firms in open economies have significant exchange rate risk (Jong et al. 2006).<br>Higher number of UK firmsare exposed to changes in theforeign exchange rate (El-Masry 2006).<br>US firms with foreign operations are affected by the exchange rate movements (Muller & Verschoor 2006).<br>More firms are exposed to exchange rate changes (Doidge et al. 2006). |
| | | The operating cash flows are of key relevance to the firms, and these are significantly impacted by the exchange rate movements (Bartram 2008).<br>As the time horizonis increased and the data across firmare pooled then factors like size, leverage, growth opportunity and liquidity make it relevant for the firms to manage the forex exposure (Agyei-Ampomah 2013). |
| | | Cross-listed Canadian firms on American exchange are more sensitive towards exchange rate changes (Booth & Rotenberg 1990).<br>The stock returns are affected by the exchange rate movement however the stock prices do not fully reflect the changes in the currency on a timely basis because of thecomplex relationship between currency price and firm value (Bartov& Bodnar 1994).<br>The sensitivity of stock returns to the exchange rate movements is small (Khoo 1994). |

| | | |
|---|---|---|
| | Stock returns are affected by the foreign exchange exposure | There is a significant relationship between changes in dollar value and stock price performance (Shin &Soenen 1999).<br>The lagged exchange rate return affect the stock return of the firm (Chiao& Hung 2000).<br>The link between stock return and changes in the yen exchange rate is negatively related to foreign operations of the firm (Doukas et al. 2003).<br>Stock prices are affected by the movement of the currency rates (Dewenter et al. 2005).<br>Stock returns of proprietary drugs are affected by the exchange rate changes while the stock return of the generic drugs is not affected by the exchange rate (Chan et al. 2002).<br>The volatility of the commonstock of the firm increases with the increase in the variability of the exchange rate(Chen & So 2002).<br>Contemptuous and lagged changes in the exchange rate are significant in explaining stock return which could be positive or negative (Choi & Kim 2003).<br>There is a significant relationship between stock return and yen fluctuations, andthe investors can access this impact of exchange rate on firm value without any delay (Doukas et al. 2003).<br>There is stronger evidence of thepresence of association between company's stock return and exchange rate changes(El-Masry 2006).<br>US stock return is asymmetrically affected by the exchange rate movements (Muller & Verschoor 2006).<br>UK firms stock returns are more affected by foreign exchange exposure (El-Masryet al. 2007).<br>The stock prices of financially distressed firms are more sensitive to exchange rate movements (Wei & Starks 2013).<br>There is aweak association between stock return and forex exposure (Agyei-Ampomah 2013). |
| | Foreign sales, foreign assets, and income | The firm with large foreign sales, assets and operating profits are more sensitive to the exchange rate changes (Choi and Prasad 1994).<br>A firm with larger proportion of foreign assets and revenue are more sensitive to exchange rate changes (Booth & Rotenberg 1990).<br>The forex exposure is positively and reliably correlated with thedegree of foreign involvement (Jorion 1990).<br>Exchange rate movement affects firm's sales volume, profit margins and input cost(Bradley & Moles 2001).<br>Domestic competition from foreign firms and foreign sales are major determinants to exchange rate exposure (Williamson 2001).<br>Firms with higher degree of export and import experience a greater foreign exchange exposure (Kiymaz 2003).<br>The ratio of foreign sales to total sales is an important explanatory variable for the foreign exchange rate exposure (Bartram 2004).<br>The impact of foreign exchange exposure on the profit margin for collusive firm is more than competing firms (Dekle 2005).<br>Firms with large international sales outperform those with international sales during periods of currency depreciation and underperform during periods of currency appreciation (Doidge et al. 2006).<br>Firm size and foreign sales ratio are significantly and positively related to the exchange rate exposure (Jong et al. 2006).<br>The exchange rate exposure coefficient is positive for the firms with foreign sales (El-Masry& Abdel-Salam 2007).<br>Financially distressed firms find it difficult to smooth out the foreign exchange fluctuations which are detrimental to managing the forex exposure (Wei & Starks 2013). |
| | | |

| | | |
|---|---|---|
| | Impact on the firm value | Exchange rate risk impacts the value of the firm even if they do not have material foreign assets, revenue or debt (Booth & Rotenberg 1990).<br>The value of the US multinationalss significantly correlated with the changes in the dollar value (Shin &Soenen 1999).<br>The industrial companies focus on the cash flow rather than market value to determine the exchange rate exposure (Aabo 2001).<br>There is a relationship between exchange rate fluctuation and the value of the firm (Chen & So 2002).<br>The changes in the exchange rate have asignificant impact on the value of the US firm with Asia operations (Choi & Kim 2003).<br>Companies face both linear and non-linear components of the foreign exchange exposure,and this non linearity originates from corporate cash flows (Bartram 2004).<br>Different objectives of the forex risk management have adifferent impact on the value of the firm (Faff & Marshall 2005).<br>The exchange rate movements do affect firm value (Choi and Prasad 1994, Doidge et al. 2006, El-Masryet al. 2007, Forné s& Cardoza 2009). |
| Characteristics of Firms and Management of Foreign Exchange Risk | Structure, policies and exchange rate exposure of the firm | Centralized risk management policy is followed by themajority of firms (Stanley & Block 1980).<br>There is a centralized control for currency risk management in UK MNC's. Further, firms which experienced high forex risk followrisk-averse policies whereas firms which experienced low risk managed only a part of it (Collier & Davis 1985).<br>Firms with high leverage, low liquidity, and high cash dividends are more exposed to forex exposures (Chow and Chen 1998).<br>Japanese firms with weak short-term liquidity position or firm with high financial leverage have more incentive to hedge and therefore have lower exposure to exchange rate exposure (He & Ng 1998).<br>The management of forex risk depends upon the structured setting of thecompanies , and there is no specific time horizon for its management(Aabo 2001).<br>The foreign exchange rate exposure is- time varying for multinational firms which changes withthe structure of the industry and industry competition changes through time (Williamson 2001).<br>Companies are risk averse, but currency risk management policies are not clearly formulated in the goals of the firm (Belk 2002).<br>Practically less number of firms show significant exchange rate exposure than the theory predicts (Bartram & Bodnar 2007).<br>Firms with higher default probabilities, greater growth opportunities, and more unique products face higher exchange rate risk (Wei & Starks 2013). |
| | Significance of firm size and growth | Large firms are positively exposed to exchange rate changes (Chow et al. 1997).<br>The magnitude of forex exposure is significantly related to the size of the firm but is weakly related to the ratio of foreign sales to total sales (Belk &Edelshain 1997).<br>For small return horizon smaller firms have small exposure and for longer return horizon larger firms have large exposure (Chow and Chen 1998).<br>Smaller Japanese firms have lower exchange rate exposure (He & Ng 1998).<br>Export to sales ratio and firm size are important determinants of exchange rate exposure (Chiao& Hung 2000).<br>Firm's with greaterbread th(diversification) have less exposure as compared with firms with greater depth (Pantzalis et al. 2001).<br>Foreign exchange exposure of the firm increased with the size of the firm (Hagelin & Pramborg 2004). |

| | | |
|---|---|---|
| | | Firm size asymmetries are of greater importance when determining thelink between stock return and currency movements (Muller & Verschoor 2006).<br>Large firms gain relative to small firms during currency depreciation even after controlling for foreign involvement (El-Masryet al. 2007).<br>Size of the firm, frequency of imports has no relationship with the foreign exchange risk management (Sirpal 2009). |
| | Experience, skills, knowledge, and ability of the managers | In case of large exchange rate exposure, the responsibility of managing it falls on finance director, in other cases, the treasurer manages this exposure (Collier & Davis 1985).<br>UK firms with high transaction risk adopted close out strategy whereas US firms allowed treasurers discretion within the agreed limits to manage currency flows (Collier et al. 1992).<br>The effectiveness of the forex risk management can be improved if the managers better understand the nature of the exposure and its impact on the organization which will enablethen to adopt better techniques for managing forex exposure (Belk &Edelshain 1997).<br>UK firms take along-term strategic view of the effects of currency fluctuations (Bradley & Moles 2001).<br>There is lack of knowledge of the impact of FX risk on firm value as the firms do not know therisk profile of their cash flows (Faff & Marshall 2005).<br>Managers incentive, knowledge on currency hedging is also an important determinant of conducting hedging activity (Hu & Wang 2006). |
| | International operations and multiple currency exposures | Export to sales ratio and firm size are important determinants of exchange rate exposure (Chiao & Hung 2000).<br>Geographical dispersion of the company does not reduce exchange rate exposure, and such companies are more likely to use financial hedges to protect themselves from the exchange rate risk (Allayannis et al. 2001).<br>The exposure effect of yen on thestock return is higher for multinationals and high-exporting firms(Doukas et al. 2003).<br>The Asian financial crisis heightened the interest of US management on the issue of company's exposure to Asia. Therefore, the exchange rate coefficient should be estimated as a function of international operations(Choi & Kim 2003).<br>The extent of internationalization is significantly positive in explaining the magnitude of FX exposure (Faff & Marshall 2005).<br>Firms with along-term commitment to the foreign markets and whose future cash inflows are primarily based on already established business activity regard foreign debt as important (Aabo 2006).<br>The proportion of significant foreign exchange exposure is higher for the firms which generate a higher percentage of revenue from abroad (El-Masry& Abdel-Salam 2007).<br>There is a positive relationship between the exchange exposure of firm and openness of trade as the firms in more open economies are exposed to greater indirect exposure which is difficult to manage as it requires firm-wide strategic approach (Hutson & Stevenson 2010). |
| | | Translation risk is managed by three-fourths of the UK firms (Collier & Davis 1985).<br>Majority of the firms in UK and US followed a consistent pattern of policy to manage transaction and translation exposure (Collier et al. 1992).<br>The central idea of foreign exchange risk management is the day to day management of transaction exposure. Along with it, the firms also manage translation and economic exposure by making cash flow forecast (Duangploy et al. 1997). |

| | | |
|---|---|---|
| Currency Risk Management Strategy | Types of foreign exchange exposure | Economic exposure impacts the profits of the firms more than transaction and translation exposure and by managing this economic exposure the tomorrow's transaction and translation exposure can be much reduced.Only large firms attempt to manage the economic exposure as it is costly to manage and requires matching of foreign currency inflows and outflows (Belk &Edelshain 1997).<br>The current strategic and financial hedging practices of US firms do not eliminate economic exposure to forex movement for many firms. Further, FDI provides greater opportunity to hedge the economic exposure of the firm (Miller &Reuer 1998).<br>MNCs in the USAplace more importance on transaction risk than translation risk. However, larger MNCs place more importance on translation risk which could be explained by their large overseas operations. Popular internal method for managing translation risk is balance sheet hedging method and popular internal method for managing transaction risk ismatching, and netting and external method is forwards (Marshall 2000).<br>Majority of the firms are concerned with managing their transaction exposure. Some firms are also actively managing their accounting exposure too. It is interesting to note that although academic favors management of economic exposure but only a few firms manage it in practice (Glaum 2000).<br>There are some complexities in classifying economic exposure , and therefore,more sophisticated evaluation techniques are required to identify firms with economic exposure (Bradley & Moles 2001).<br>Industrial companies consider transaction exposure to be the most important exposure to be managed while very little importance is assigned to translation exposure (Aabo 2001).<br>The firms should take the structure of economic exposure into account for estimating the exposure (Bartram 2004).<br>Companies do not focus on the economic exchange rate risk. It is important for the firms to focus on this exposure especially when the world has become globalized. Companies should consider long-term forward-looking perspective, should focus on cash flows, take into account the effects of exchange rate changes on price and quantity, consider theoperative flexibility of the firm and focus on the currencies of denomination and determination (Bartram et al. 2005). |
| | Operational strategies for managing the currency risk | Differentiation strategies of the companiesdo not help in controlling the effects of exchange rate fluctuation (Miller &Reuer 1998).<br>Corporations will use operational hedging strategy only when they face both exchange rate and demand uncertainty(Chowdhry& Howe 1999).<br>Firms also use foreign debt to protect themselves from exchange rate movements, and foreign sales is an important factor in determining the use of foreign debt (Allayannis & Ofek 2001).<br>Firm's ability to construct operational hedges lead to lower forex exposure for the MNC (Pantzalis et al. 2001).<br>Companies in which export constitute a significant proportion of the net sales are more likely to raise foreign currency debt. Large firms with a wider access to financial markets are more likely to raise debt than small firms (Keloharju &Niskanen 2001).<br>Larger firms have lower exposure due to their ability to use operational hedging strategies (Hagelin & Pramborg 2004).<br>Debt dominated in the foreign currency is an important alternative to the use of currency derivative for managing the forex exposure. This importanceis further linked to geographical expansion, thevalue of thefirm and on assets to debt ratio (Aabo 2006). |

| | | |
|---|---|---|
| | | Use of derivative has no significant effect on the management of exchange rate exposure, and the exposure is significantly reduced by using operational strategies or on balance sheet hedging methods like foreign loans and operations (Jong et al. 2006).<br>Operational hedging strategies can be effective in managing short-term exposure. Many global firms use limited financial derivatives despite higher levels of currency risk exposure (Kim et al. 2006). |
| | Financial strategies for managing the currency risk | Forwards are the most commonly used derivatives for forex risk management (Stanley & Block 1980).<br>The most popular derivatives for the risk management are forwards followed by options (Duangploy 1997).<br>Most firms successfully hedge the effects of short-term exchange rate changes using forward contracts (Belk &Edelshain 1997).<br>Firms which deal in commodity use financial instruments to contain the forex risk. Mostly the firms use the financial hedges to manage short-term exposure (Chowdhry& Howe 1999).<br>Asian Pacific MNCs were more likely to use a larger number of external instruments and - the exchange traded instruments(Marshall 2000).<br>How a firm hedges its exposure depends upon foreign exchange volatility, exposure volatility, technical factors and recent hedging outcomes (Brown 2001).<br>Using foreign currency derivatives for theshorter duration like a weekora month captures the transaction exposure which is effectively hedged (Nguyen & Faff 2003).<br>The non-linear foreign exchange exposure suggests the use of financial hedges instruments to manage the forex exposure (Bartram 2004).<br>Financial hedging can be effective for hedging short-term exposure which is transaction exposure (Kim et al. 2006).<br>Firms use one or more hedging instruments to manage forex exposure. Mostly larger firms hedge the currency risk (Davies et a. 2006).<br>Independent multinational firms have tighter financial constraints and are more likely to hedge the exposure (He & Ng 1998).<br>Multinationals use hedging their exposure, resulting in insignificant exposure of total cash flows(Bartram 2008).<br>Methods such as cash in advance, open account, documentary collections, irrevocableL/C etc. are used to a greater extent by firms involved in foreign exchange transactions. Methods like foreign currency overdrafts, leading and lagging, currency forwards, futures and options are used to lesser extent (Sirpal 2009).<br>The Latin American companies mainly used financial hedging instruments for managing the exchange rate exposure (Forn s& Cardoza 2009).<br>The use of foreign debt is not a preferred strategy for highly levered firms. These firms use swaps to create synthetic liabilities. Overall the result shows that it is important to use swaps for hedging the currency risk and improving the firm value (Clark & Judge 2009).<br>UK non-financial firms use derivatives to manage forex risk which is effective in reducing this exposure (Zhou & Wang 2013).<br>The financial hedging strategyis the complementary strategy which helps in reducing the exchange rate risk which the firms face. Company's assertive level, market risk, regulation, knowledge, and skill of the firm all determine the execution of financial hedging (Chong et al. 2014). |

| | | |
|---|---|---|
| | Interaction of Operational and Financial strategies | The overall result suggests that the firm use currency derivative and foreign debt as ahedge against forex fluctuation. The firms use of operational hedges in conjunction with the financial hedges improves the value of the firm (Allayannis&Ofek 2001).<br>Financial and operational hedging effectively reduce the effect of exchange rate changes on stock prices (Dewenter et al. 2005).<br>Financial as well as operational hedging can cope with the foreign exchange rate exposure (Bartram et al. 2005).<br>The financial and operating hedging strategies are complementary and help in reducing the risk exposure. MNCs adopt these to manage their overall forex risk (Kim et al. 2006).<br>Firms use both operational and financial hedging strategy where matching/netting and currency forward contracts are the most popular tools of forex risk management. However, external tools are more popularly used than internal tools (Davies et al. 2006).<br>The non-financial firm can employ both financial and operational forex risk management strategy (Bartram & Bodnar 2007).<br>There is aninteraction between operational and financial strategies of the firm which is reflected in the firm's exchange rate exposure quotient (El-Masryet al. 2007).<br>The use of operational hedging strategies in conjunction with the financial hedging strategy is value enhancing for Canadian firms (Faseruk and Mishra 2008).<br>The Latin American companies, from experience and learning, adopted models based on active participation of different functional areas in the companies to manage the exchange rate risk. Thus, a cross-functional approach is adopted to manage the exchange rate risk (Fornés& Cardoza 2009). |
| | Financial Models and firm exposure | Capturing the time-varying means and variances of the exchange rate series in the financial models lead to better risk and return characteristics of the hedging strategies. Additionally,no one model is uniformly superior for all criteria. Therefore, it is important to choose the level of risk behavior and the class criterion functions in combination with a specific model than to endlessly fight on the specific functional forms of the time series models for exchange rate return (Bos et al. 2000).<br>Standard one month horizon is not necessarily optimal for estimating exposure, and longer horizons are preferable. Further, the choice of themarket portfolio in the exposure model has a strong impact on the resulting estimates of the firm level exchange rate exposure (Bodnar & Wong 2003).<br>Exchange rate exposure and its determinants are sensitive to estimation methods (Agyei-Ampomah 2013). |
| Hedging the Foreign Exchange Risk | Reasons for hedging with derivatives | Firms with high growth opportunities but low accessibility to internal and external financing are most likely to use currency derivatives to reduce cash flow variations (Géczy et al. 1997).<br>Hedging is more common in large firms than small firms (Shin &Soenen 1999).<br>Most of the firms hedge their foreign exchange risk, but only a few firms fully hedge their exposure and majority of firms hedge only part of their exposure (Glaum 2000).<br>Firms that use currency derivative has ahigher value than firms which do not use currency derivatives (Allayannis& Weston 2001).<br>Informational asymmetries, facilitation of internal contracting and competitive pricing are the primary motivation for hedging (Brown 2001).<br>Firm's exposure through foreign sales and trade is a very important factor that prompts and guides their decision to hedge (Allayannis&Ofek 2001).<br>Firms use currency derivativesto hedge transacting exposure to increase the value of the firm. Translation exposure, however, is not hedged using derivatives (Hagelin 2003). |

| | | |
|---|---|---|
| | | Firms with higher growth opportunities, higher leverage and lower liquidityhave more incentive to hedge the exchange rate exposure (El-Masryet al. 2007).<br>Canadian firms with higher level of US sales tend to use derivatives more often for forex risk management, but firm with both US sales and assets do not use derivatives as often (Faseruk and Mishra 2008).<br>It is important to distinguish between the derivative instrument that is appropriate for hedging short-term transaction exposure like forwards and options and those that are appropriate for hedging long-term multiple periods foreign currency exposure like swaps (Clark & Judge 2009).<br>Forex derivatives are used to enhance the shareholder's wealth by reducing the firm's forex exposure. Firms having larger outsider's holdings are more likely to make hedging decisions in the best interest of the shareholders (Afza and Alam 2011). |
| | Effectiveness of hedging | Hedging effectiveness is positively related to the hedging effort (Belk &Edelshain 1997).<br>Australian firms are effective in hedging short-term exposure they have limited success in hedging long term exposure (Nguyen & Faff 2003).<br>There isrisk -reducing effect from transaction exposure hedges and translation exposure hedging which implies that the hedging is effective (Hagelin&Pramborg 2004). |
| Foreign Exchange Market and Risk Management | Growth of foreign exchange market | The three market liberalization events in Taiwan significantly affected the exchange rate exposure of the firms (Chiao& Hung 2000).<br>Given the low trading volume of the derivatives in Malaysia, the market players need to be educated in the use of derivatives for minimizing risk (Chong et al. 2014). |
| | Efficiency of the foreign exchange market | Most of the financial managers do not accept that the random walk hypothesis is applicable on the foreign exchange market (Stanley & Block 1980).<br>Firms widely use exchange rate forecast and base their risk management strategies on these forecasts which is an indication that they do not believe in the efficient market hypothesis and are able to beat the market with their own forecast. The academics, however, states that it is very difficult to make systematically successful exchange rate forecast (Glaum 2000).<br>Currency rate changes are not all equally predictable, and thus currency risk measures should be adjusted for predictability to conform to the definition of currency exchange rate risk (Fiedor&Hoła 2016). |
| | Forex speculation and risk management | Firms on average hedge and not speculate in the market (Géczy et al. 1997).<br>Firms use derivatives to hedge rather than speculate in the market (Allayannis&Ofek 2001).<br>Foreign exchange speculation is widesp read in the Danish firms with foreign operations. This active speculation is positively related to the size and international involvement of the firm. The speculation also increases with the involvement of non finance department in forex risk management (Aabo et al. 2012). |
| | | The distinction between domestic and foreign operations is not always clear because of issues like transfer pricing and cost allocation, and therefore, FASB has left wide scope for managers for this interpretation. This resulted in different definition of foreign sales which further create measurement errors (Jorion 1990).<br>FASB lacks standards on accounting for innovative financial instruments used for the managing the forex risk (Duangploy 1997). |

| | | |
|---|---|---|
| Regulations for Management of Foreign Exchange Risk | Accounting for exposure | SFAS 133 (accounting standard issued in June 1998 by FASB) on accounting and reporting standards for thederivative financial instrument is an improvement over the previous standards (Duangploy&Helmi 2000).<br>FASB requires that all derivatives be reported on thebalance sheet as an asset or liability and measured at their fair value. Accounting differs depending on the classification of derivative as a fair value hedge or cash flow hedge. Companies should be aware of this requirement (Wilson &Heitger 2002).<br>If the new accounting rule IAS 39 unduly influences the use of derivatives or encourage firms to move away from the derivatives and use other operational hedging methods like foreign currency debt, then this could have negative consequences for the shareholder value (Clark & Judge 2009).<br>The FRS 13 guidelines implemented in the UK mandates the numeric disclosure of derivative use by firms which is helpful in revealing important information to investors (Zhou & Wang 2013). |

**Reasons for Managing Foreign Exchange Risk**

The foremost finding in most papers is theidentification of reasons for managing the foreign exchange risk. This finding is sub-clustered in four categories as per various reasons highlighted by different studies.

**Relevance of the currency risk management for companies or industry**

Dufey&Srinivasulu 1983 stated that market imperfections make it necessary for the companies to manage the forex risk. Further, firms in open economies are highly exposed to the forex riskand are, therefore, adversely affected by the exchange rate movements (Bodnar & Gentry 1993, Chow & Chen 1998, Kiymaz 2003, Doidge et al. 2006, Jong et al. 2006, El-Masry 2006, Muller & Verschoor 2006). The currency risk management is relevant for the companies to manage because the fluctuations in the foreign exchange market impact the operating cash flows (Bartram 2008). Moreover, as the time horizon increases factors like size, leverage, growth opportunity, and liquidity make it more pertinent for the firms to manage this exposure (Agyei-Ampomah 2013).

**Stock returns are affected by the foreign exchange exposure**

Many studies equate the management of foreign exchange risk with the impact the exchange rate fluctuations have on the stock return for the company. If the stock return for the company is impacted by the fluctuations, then there is a need for risk management. Majority of the studies found that the stock returns are impacted by the exchange rate fluctuations (Booth & Rotenberg 1990, Bartov & Bodnar 1994, Shin & Soenen 1999, Chiao & Hung 2000, Dewenter et al. 2005, Chan et al. 2002, Chen & So 2002, Choi & Kim 2003, Doukas et al. 2003, El-Masry 2006, Muller & Verschoor 2006, El-Masry et al 2007, Wei & Starks 2013). Only two studies found aweak association between stock return and forex rate fluctuation (Khoo 1994, Agyei-Ampomah 2013).

**Foreign sales, foreign assets, and income**

The exchange rate fluctuations should have more impact for the companies which have large foreign sales, more foreign assets, more income from abroad and ahigher degree of export and import. Studies which support this reason are Choi and Prasad 1994, Booth & Rotenberg 1990, Jorion 1990, Williamson 2001, Kiymaz 2003, Bartram 2004, Doidge et al. 2006, Jong et al. 2006, El-Masry& Abdel-Salam 2007. Exchange rate fluctuations have a direct impact on the firm's sales volume and profit margin (Bradley & Moles 2001).

**Impact on the firm value**

There is a direct impact of the exchange rate changes on the value of the firm (Booth & Rotenberg 1990, Choi and Prasad 1994, Shin & Soenen 1999, Chen & So 2002, Choi & Kim 2003, Faff & Marshall 2005, Doidge et al. 2006, El-Masry et al 2007, Fornés & Cardoza 2009)

Two important determinants of the management of foreign exchange exposure are cash flows and value of the firms. Aabo in his study in 2001 stated that the industrial companies focus on the cash flow rather than market value to determine the exchange rate exposure.Bartram 2004 also mentioned that non-linearity in the foreign exchange exposure originated from the corporate cash flows.

**Characteristics of Firms and Management of Foreign Exchange Risk**

The management of the foreign exchange risk is also related to the characteristics of the companies. This cluster is divided intofour sub-clusters, presented below.

**Structure, policies and exchange rate exposure of the firm**

The companies have centralized control for risk management (Stanley & Block 1980, Collier & Davis 1985). Additionally, firms with low forex risk manage only a part of the forex risk (Collier & Davis 1985).Later studies mentioned that the structure of the company and the industry determines the management of the exchange rate exposure (Aabo 2001, Williamson 2001). Belk 2002 mentioned that although the companies are risk averse, they do not formulate the currency risk management policies in their goals which implies that this exposure is not given sufficient importance or maybe because practically less number of firms show significant exchange rate exposure than the theory predicts (Bartram & Bodnar 2007).Firms with high leverage and low liquidity have more incentive to hedge (Chow and Chen 1998 and He & Ng 1998).

**Significance of firm size and growth**

The foreign exchange rate exposure is higher for large companies and smaller for small companies (Chow et al. 1997, Belk &Edelshain 1997, Chow and Chen 1998, He & Ng 1998, Chiao& Hung 2000, Hagelin&Pramborg 2004, Muller & Verschoor 2006 and El-Masryet al. 2007). Only one study, Sirpal 2009 has found that size of the firms is not related to the exchange rate risk. Further, more diversified firms have less forex exposure (Pantzalis et al. 2001).

**Experience, skills, knowledge, and ability of the managers**

The forex risk is managed by treasurers of the companies, but in case of large exposure, finance director manages it (Collier & Davis 1985).While comparing companies in UK and US, UK firms adopted close out risk management strategy whereas US firms allow limited treasurer's discretion to manage the exposure (Collier et al. 1992).Additionally, UK firms take along-term strategic view of the currency exposure (Bradley & Moles 2001). If managers better understand the nature of the exposure and its impact on the organization, then the effectiveness of the risk management can be improved (Belk & Edelshain 1997) but managers lack this knowledge (Faff & Marshall 2005). Further, hedging of risk is also dependent upon managers incentive and knowledge on currency hedging (Hu & Wang 2006).

**International operations and multiple currency exposures**

Multinational firms are present in multiple countries. The geographical dispersion of the company increases its exposure to the foreign exchange risk (Chiao & Hung 2000, Allayanniset al. 2001, Doukas et al. 2003, Choi & Kim 2003, Faff & Marshall 2005, Aabo 2006, El-Masry& Abdel-Salam 2007, Hutson & Stevenson 2010). Moreover, such companies are more likely to use financial hedges to protect themselves from the exchange rate risk (Allayanniset al. 2001).

**Foreign Exchange Risk Management Strategy**

The next findings are related to the forex risk management strategies. There are three kinds of foreign exchange exposures - transaction, translation and economic which is managed by operational and financial strategies. This cluster is divided into five sub-clusters.

**Types of foreign exchange exposure**

Foreign exchange risk encompasses three kinds of exposure – transaction, translation and economic. Transaction risk arises because of time delay in the execution and conclusion of a transaction. Translation risk is the accounting or balance sheet exposure which arises when the financial statements of the company are compiledtogether, and economic risk measures the impact of exchange rate fluctuation on the future cash flows of the firm. Out of these three exposures, transaction risk is most actively managed.Companies also focus on and manage translation risk but do not take any measure to manage economic exposure (Collier & Davis 1985, Collier et al. 1992, Marshall 2000, Glaum 2000, Aabo 2001 and Bartram et al. 2005). Economic exposure is ignored because there are some complexities in managing this exposure (Bradley & Moles 2001) but firms should take the structure of this exposure into account for formulating risk management strategy (Bartram 2004). The importance of economic exposure has increased with globalization. This exposure has more impact on profit than transaction and translation exposure, and it is important for the firms to manage it for long-term growth. Since it is costly to manage economic exposure, few large firms do manage it. Further, FDI would provide greater opportunity to hedge the economic exposure (Belk &Edelshain 1997, Miller &Reuer 1998 and Bartram et al. 2005).

**Operational strategies for managing the currency risk**

Operational strategies are also called internal strategies where the company manage its operations to control the forex exposure. Companies might lead or lag a payment, diversify its operations and operate in multiple currencies to enable netting of exposureor deal in home currency only, etc. Companies might also use foreign debt to protect themselves from exchange rate movement (Allayannis & Ofek 2001, Keloharju & Niskanen 2001, Aabo 2006).Large firms use operational hedges which lead to lower forex exposure (Pantzalis et al. 2001, Hagelin & Pramborg 2004, Jong et al. 2006). This strategy is also usedwhen companies face demand uncertainty (Chowdhry & Howe 1999). Companies that use operational hedging strategies limit the use of financial derivatives (Kim et al. 2006). One study also argued that differentiation strategies do not help in controlling the exchange rate exposure (Miller &Reuer 1998).

**Financial strategies for managing the currency risk**

Financial strategies are popular methods of hedging the nonlinear exchange rate exposure of the company which involves the use of forex derivatives (Marshall 2000, Bartram 2004,Bartram 2008,Fornés& Cardoza 2009,Zhou & Wang 2013). The most commonly used derivative is forward. The financial hedges help the company in managing short-term exposure which is transactionexposure mostly (Stanley & Block 1980, Duangploy 1997, Belk & Edelshain 1997, Chowdhry & Howe 1999, Nguyen & Faff 2003, Kim et al. 2006). Large, independent and highly levered multinational firms use derivatives to hedge the forex exposure (He & Ng 1998, Davies et a. 2006, Clark & Judge 2009). There are various factors which determine the use of financial hedging like company's assertive level, market risk, regulation, knowledge, and skill of the firm (Chong et al. 2014).

**Interaction of Operational and Financial hedging strategies**

Both operational and financial hedging strategies are complementary strategies and firm use both together to manage their exposure(Allayannis & Ofek 2001, Dewenter et al. 2005, Bartram et al. 2005, Kim et al. 2006, Davies et al. 2006, Bartram & Bodnar 2007, El-Masry et al 2007, Faseruk and Mishra 2008). The use of both the strategies together is value enhancing for the companies (Allayannis&Ofek 2001, Faseruk and Mishra 2008). Latin American firms adopt a cross-functional approach to manage the exchange rate risk (Fornés& Cardoza 2009)

**Financial Models and firm exposure**

It is important to adopt financial models for effective management of forex risk. The exchange rate exposure is sensitive to the choice of estimation methods (Agyei-Ampomah 2013). Moreover, taking the time-varying means and variances of the exchange rate series in the financial models lead to betterhedging strategies. It should also be noted that there is no one model that is uniformly superior for all criteria (Bos et al. 2000).

**Hedging the Foreign Exchange Risk**

Companies use currency derivatives because they have high leverage, low liquidity and less accessibility to internal and external financing, to take advantage of informational asymmetries, to contain the exposure of foreignsales and trade (Géczy et al. 1997, Brown 2001, Allayannis & Ofek 2001, El-Masry et al. 2007, Faseruk and Mishra 2008). Studies also show that firms which hedge using derivatives have higher values than firms which do not use derivatives (Allayannis& Weston 2001, Hagelin 2003, Afza and Alam 2011). Forwards and options are used for short-term hedging,and currency swaps are used for long-term hedging (Clark & Judge 2009).

**Effectiveness of hedging**

Once the hedges are undertaken, it is important to determine the effectiveness of thehedge. This effectiveness is positively related to the hedging effort (Belk &Edelshain 1997). Hedging becomes effective if it reduces the forex risk of the company (Hagelin&Pramborg 2004).Nguyen & Faff (2003) studied the Australian companies and concluded that these companies effectively manage short-term exposures.

**Foreign Exchange Market and Risk Management**

The next most important section studied by the articles is the forex market. This section is sub-clustered into three categories

**Growth of foreign exchange market**

The articles focusing on the emerging economies studied the growth of forex market in these countries. Chiao& Hung (2000) concluded that liberalization of Taiwan significantly impacted the exchange rate exposure of the firms. Chong et al. (2014) studied the Malaysian market and concluded that the market players shouldbe educatedto derivatives for minimizing risk.

**Efficiency of the foreign exchange market**

The efficiency of the market is related to the concept of informational efficiency where the prices reflect the true information available in the market. Random walk hypothesis is consistent with the efficiency of the market. Most of the managers use exchange rate forecast to formulate hedging strategy which indicates that they do not believe in the efficient market hypothesis (Stanley & Block 1980, Glaum 2000). Studies also argue that the exchange rates are not equally predictable and therefore, the exchange rate measures should be adjusted for predictability for formulating hedging strategy (Fiedor&Ho³da 2016).

### Forex speculation and risk management

Hedging and speculation are two different activities. Hedging is undertaken to cover the risk associated with the forex exposure whereas the objective of speculation is to take advantage of disequilibrium in the market and earn profits. Firms operate in the market with the objective of managing the risk and not of earning profits. Thus, they hedge and not speculate (Géczy et al. 1997, Allayannis&Ofek 2001). However, the speculation is positively related to the size and internationalization of the company (Aabo et al. 2012).

### Regulations for Management of Foreign Exchange Risk

Regulations pertaining to the management of foreign exchange risk are the guidelines for the companiessupervising them to account for the exposure in their books. This is an important information which the companies should reveal for the sake of the stakeholders in their organization. Two significant international accounting regulatory bodies are FASB (Financial Accounting Standard Board), based in the United States and IASB (International Accounting Standard Board), based in London, United Kingdom.

### Accounting for exposure

The accounting guidelines for forex exposure management were unclear initially as FASB had left wide scope for managers for interpretation of various issues to clearly distinguish between domestic and foreign operations (Jorion 1990). Further, FASB lacked standards on accounting for innovative financial instruments used for the managing the forex risk (Duangploy 1997).SFAS 133 (accounting standard issued in June 1998 by FASB) on accounting and reporting standards for derivative financial instrument were an improvement over the previous standards (Duangploy & Helmi 2000) where it required that all derivatives should be reported on balance sheet as an asset or liability and should be measured at their fair value (Wilson & Heitger 2002). The accounting standards issued by IASB, IAS 39 in 2003, alsolacked important considerations. It unduly influenced the use of derivatives and encouraged firms to move away from the derivatives and use other operational hedging methods like foreign currency debt which could result in negative consequences for the shareholder value (Clark & Judge 2009). Further, FRS 13 guidelines which were implemented in the UK mandated the numeric disclosure of derivative used by firms which helped in revealing important information to investors (Zhou & Wang 2013). However, this standard has been withdrawnfor reporting periods starting on or after 1 January 2015.

## Discussion

Foreign exchange risk is an important segment in the overall risk faced by the companies. With the internationalization of the operations of the company, globalization of markets and open and unrestricted movement of people and resources across geographies, the impact of foreign exchange fluctuations on company's profits and value is increasing. Majority of the studies included in this systematic review focused on developed nations. The attention of researchers shifted towards developing economies after the year 2000. This could be because most of these economies were closed economies till the 1990's. A major shift in their structure came with the reforms of liberalization and globalization which majority of developing countries (India, Brazil, Mexico and South Korea) adopted in the 1990s. This liberalization was followed by the growth and development of these economies, and they were now termed as the emerging economies. Major emerging economies today comprise of India, China, Brazil, Russia, Mexico, South Africa, Malaysia amongst others. With the growth of these nations, development of the industry and internationalization of companies, the impact of fluctuating forex rate was also felt by the companies operating in the emerging markets. Since there are very limited studies

which focus on the forex risk management by companies in emerging markets, the future researchers should conduct more meaningful and substantial studies on these economies.

The foreign exchange risk is relevant for the companies to manage because it impacts the stock return and value of the company. This foreign exchange risk is higher for the companies with higher international exposure. This implies that although dealing in multiple currencies and diversification of operations across geographies might help in netting the overall exposure, but it more likely might lead to increase in the exposure to foreign exchange fluctuations. The foreign exchange exposure of the firm is impacted by the size of the company, its structure, and policies for managing it. Managers knowledge, skill, and abilityare also crucially important for the risk management. Further, abetter understanding of the manager about the nature of exposure, its impact on the company value, the forex market of the country and the regulations, etc. would lead to better and efficient risk management strategies.

There are two kinds of strategies which a company can employ. These can be classified as operational strategies and financial strategies. Operational strategies are internal to the firm which comprise of the use of foreign debt in the capital structure, settlement of transactions in the home currency, inter-company netting of receipts, etc. Other strategy is called the financial strategy as it deals with the use of currency derivatives to hedge the exchange rate risk. The studies show that both the strategies are complementary to each other and using them together would increase the value of the firm. Once the strategy has been implemented, it is necessary to check for the effectiveness of the same. Generally, firms carry out the effectiveness of the implemented financial or hedging strategy. Out of all the articles studied, only three articles study the effectiveness of the hedging strategy. There are two reasons for this. First, there is no unique or standard definition of theeffectiveness of hedge because of which classification of aneffective hedging strategy for a firm is difficult. Second, calculating the effectiveness is not a standard practice as it is not a mandatory requirement for the firms. But this has changed now. The new accounting standards IFRS 9, which are accepted by themajority of the nations, provide a separate section on measurement and reporting of hedge effectiveness. The second gap is thus, to explore, research and develop models for evaluating hedge effectiveness. The future research can focus on calculating theeffectiveness of the hedges undertaken by the companies.

Foreign exchange risk management is a holistic concept which involves the study of the forex market, thestudy of the structure and operations of the company and internationalization and multi-currency dealings of the company, etc. The risk management strategy cannot be formed in isolation, and all these parameters must be considered. Out of the articles which are discussed in the paper, only a handful talk about the foreign exchange market. This is the third gap, and the future researchers can focus on studying the structure and inter-relationships of the foreign exchange market necessary for formulating an effective strategy. Structure of the companies has also undergone tremendous change over the years. These changes in the structure are a reflection of changes in the external environment, be it market changes, internationalization of the operations, regulatory changes, etc. The studies under consideration pay very less importance to the organizational structure which provides a scope for thefourthgap where future research can focus on the evolution of the structure of company for foreign exchange risk management.

## Conclusion

The present study highlights four research gaps. First, future research should focus on the foreign exchange risk management strategiesof the companies in emerging economies. Second, hedging effectiveness should be given due importance, and future studies should focus on evaluating theeffectiveness of hedging. Third, it is important to understand the foreign exchange

marketbefore forming any risk management strategies. Therefore, the future research should examine the nature and inter-relationships between forex market. Fourth, future research should exploreand evaluate the changes in the organizational structure that has come over the years for the management of foreign exchange risk.

Like any other study, the present study also suffers from few limitations. First, the findings of the study are limited to the research articles under study which is again limited by the inclusion and exclusion criteria. Further, our selection process strictly focused on journal articles and excluded other types of literature like books, Ph.D. Thesis, technical reports, working papers and articles published in conference proceedings which are collectively called as grey literature. Although inclusion of these could have enriched our results butthese controls were necessary to implementto maintain the quality of the study and reliability of the results. The review was confined to the journal articles because these are the usual means of communicating novel scientific findings.

## References


- Aabo, T. (2001). Exchange rate exposures and strategies of industrial companies: an empirical study. Thunderbird International Business Review, 43(3), 379-395.
- Aabo, T. (2006). The importance of corporate foreign debt in managing exchange rate exposures in non-financial companies. European Financial Management, 12(4), 633-649.
- Aabo, T., Andryeyeva Hansen, M., &Pantzalis, C. (2012). Corporate foreign exchange speculation and integrated risk management. Managerial Finance, 38(8), 729-751.
- Afza, T., &Alam, A. (2011). Corporate derivatives and foreign exchange risk management: A case study of non-financial firms of Pakistan. The Journal of Risk Finance, 12(5), 409-420.
- Agyei-Ampomah, S., Mazouz, K., & Yin, S. (2013). The foreign exchange exposure of UK non-financial firms: A comparison of market-based methodologies. International Review of Financial Analysis, 29, 251-260.
- Allayannis, G., &Ofek, E. (2001). Exchange rate exposure, hedging, and the use of foreign currency derivatives. Journal of international money and finance, 20(2), 273-296.
- Allayannis, G., & Weston, J. P. (2001). The use of foreign currency derivatives and firm market value. The review of financial studies, 14(1), 243-276.
- Allayannis, G., Ihrig, J., & Weston, J. P. (2001). Exchange-rate hedging: Financial versus operational strategies. The American Economic Review, 91(2), 391-395.
- Bartov, E., & Bodnar, G. M. (1994). Firm valuation, earnings expectations, and the exchange-rate exposure effect. The journal of Finance, 49(5), 1755-1785.
- Bartram, S. M. (2004). Linear and nonlinear foreign exchange rate exposures of German nonfinancial corporations. Journal of international money and finance, 23(4), 673-699.
- Bartram, S. M. (2008). What lies beneath: Foreign exchange rate exposure, hedging and cash flows. Journal of Banking & Finance, 32(8), 1508-1521.
- Bartram, S. M., & Bodnar, G. M. (2007). The exchange rate exposure puzzle. Managerial Finance, 33(9), 642-666.
- Bartram, S. M., Dufey, G., & Frenkel, M. R. (2005). A primer on the exposure of non-financial corporations to foreign exchange rate risk. Journal of Multinational Financial Management, 15(4), 394-413.
- Belk, P. A. (2002). The organisation of foreign exchange risk management: a three-country study. Managerial Finance, 28(11), 43-52.
- Belk, P. A., &Edelshain, D. J. (1997). Foreign exchange risk management—the paradox. Managerial Finance, 23(7), 5-24.
- Bodnar, G. M., & Gentry, W. M. (1993). Exchange rate exposure and industry characteristics: evidence from Canada, Japan, and the USA. Journal of international Money and Finance, 12(1), 29-45.

- Bodnar, G. M., & Wong, M. F. (2003). Estimating exchange rate exposures: issues in model structure. Financial Management, 35-67.
- Booth, L., & Rotenberg, W. (1990). Assessing foreign exchange exposure: theory and application using Canadian firms. Journal of International Financial Management & Accounting, 2(1), 1-22.
- Bos, C. S., Mahieu, R. J., & Van Dijk, H. K. (2000). Daily exchange rate behaviour and hedging of currency risk. Journal of Applied Econometrics, 15(6), 671-696.
- Bradley, K., & Moles, P. (2001). The effects of exchange rate movements on non-financial UK firms. International Business Review, 10(1), 51-69.
- Brown, G. W. (2001). Managing foreign exchange risk with derivatives. Journal of Financial Economics, 60(2), 401-448.
- Chan, K. C., Seow, G. S., & Tam, K. (2002). Foreign exchange risk and firm value: An analysis of US pharmaceutical firms. Managerial Finance, 28(3), 57-72.
- Chen, C. C., & So, R. W. (2002). Exchange rate variability and the riskiness of US multinational firms: evidence from the Asian financial turmoil. Journal of Multinational Financial Management, 12(4), 411-428.
- Chiao, C., & Hung, K. (2000). Exchange-rate exposure of Taiwanese exporting firms. Review of Pacific Basin Financial Markets and Policies, 3(02), 201-233.
- Choi, J. J., & Kim, Y. C. (2003). The Asian exposure of US firms: Operational and risk management strategies. Pacific-Basin Finance Journal, 11(2), 121-138.
- Choi, J. J., & Prasad, A. M. (1995). Exchange risk sensitivity and its determinants: A firm and industry analysis of US multinationals. Financial Management, 77-88.
- Chong, L. L., Chang, X. J., & Tan, S. H. (2014). Determinants of corporate foreign exchange risk hedging. Managerial Finance, 40(2), 176-188.
- Chow, E. H., & Chen, H. L. (1998). The determinants of foreign exchange rate exposure: Evidence on Japanese firms. Pacific-Basin Finance Journal, 6(1), 153-174.
- Chow, E. H., Lee, W. Y., &Solt, M. E. (1997). The economic exposure of US multinational firms. Journal of Financial Research, 20(2), 191-210.
- Chowdhry, B., & Howe, J. T. (1999). Corporate risk management for multinational corporations: Financial and operational hedging policies. Review of Finance, 2(2), 229-246.
- Clark, E., & Judge, A. (2009). Foreign currency derivatives versus foreign currency debt and the hedging premium. European Financial Management, 15(3), 606-642.
- Collier, P., & Davis, E. W. (1985). The management of currency transaction risk by UK multi-national companies. Accounting and business research, 15(60), 327-334.
- Davies, D., Eckberg, C., & Marshall, A. (2006). The determinants of Norwegian exporters' foreign exchange risk management. European Journal of Finance, 12(03), 217-240.
- Dekle, R. (2005). Exchange rate exposure and foreign market competition: Evidence from Japanese firms. The Journal of Business, 78(1), 281-300.
- Dewenter, K. L., Higgins, R. C., &Simin, T. T. (2005). Can event study methods solve the currency exposure puzzle?. Pacific-Basin Finance Journal, 13(2), 119-144.
- Doidge, C., Griffin, J., & Williamson, R. (2006). Measuring the economic importance of exchange rate exposure. Journal of Empirical Finance, 13(4), 550-576.
- Doukas, J. A., Hall, P. H., & Lang, L. H. (2003). Exchange rate exposure at the firm and industry level. Financial Markets, Institutions & Instruments, 12(5), 291-346.
- Duangploy, O., &Helmi, D. (2000). Foreign currency hedge accounting: multi-currency versus functional currency accounting. Managerial Auditing Journal, 15(5), 232-246.
- Duangploy, O., Bakay, V. H., & Belk, P. A. (1997). The management of foreign exchange risk in US multinational enterprises: an empirical investigation. Managerial Finance, 23(7), 85-99.
- Dufey, G., &Srinivasulu, S. L. (1983). The case for corporate management of foreign exchange risk.

Financial Management, 54-62.

- El-Masry, A. A. (2006). The exchange rate exposure of UK nonfinancial companies: industry level analysis. Managerial Finance, 32(2), 115-136.
- El-Masry, A., & Abdel-Salam, O. (2007). Exchange rate exposure: do size and foreign operations matter?. Managerial Finance, 33(9), 741-765.
- El-Masry, A., Abdel-Salam, O., &Alatraby, A. (2007). The exchange rate exposure of UK non-financial companies. Managerial Finance, 33(9), 620-641.
- El-Masry, A., Abdel-Salam, O., &Alatraby, A. (2007). The exchange rate exposure of UK non-financial companies. Managerial Finance, 33(9), 620-641.
- Faff, R. W., & Marshall, A. (2005). International evidence on the determinants of foreign exchange rate exposure of multinational corporations. Journal of International Business Studies, 36(5), 539-558.
- Faseruk, A., & Mishra, D. R. (2008). An examination of US dollar risk management by Canadian non-financial firms. Management Research News, 31(8), 570-582.
- Fiedor, P., &Holda, A. (2016). Information-theoretic approach to quantifying currency risk. The Journal of Risk Finance, 17(1), 93-109.
- Fornés, G., & Cardoza, G. (2009). Foreign exchange exposure in emerging markets: A study of Spanish companies in Latin America. International Journal of Emerging Markets, 4(1), 6-25.
- Géczy, C., Minton, B. A., &Schrand, C. (1997). Why firms use currency derivatives. the Journal of Finance, 52(4), 1323-1354.
- Glaum, M. (2000). Foreign-Exchange-Risk Management in German Non-Financial Corporations: An Empirical Analysis. In Risk Management (pp. 373-393). Springer Berlin Heidelberg.
- Hagelin, N. (2003). Why firms hedge with currency derivatives: an examination of transaction and translation exposure. Applied Financial Economics, 13(1), 55-69.
- Hagelin, N., &Pramborg, B. (2004). Hedging foreign exchange exposure: risk reduction from transaction and translation hedging. Journal of International Financial Management & Accounting, 15(1), 1-20.
- He, J., & Ng, L. K. (1998). The foreign exchange exposure of Japanese multinational corporations. The Journal of Finance, 53(2), 733-753.
- Hu, C., & Wang, P. (2005). The determinants of foreign currency hedging–evidence from Hong Kong non-financial firms. Asia-Pacific Financial Markets, 12(1), 91-107.
- Hutson, E., & Stevenson, S. (2010). Openness, hedging incentives and foreign exchange exposure: A firm-level multi-country study. Journal of International Business Studies, 41(1), 105-122.
- Jong, A., Ligterink, J., &Macrae, V. (2006). A Firm-Specific Analysis of the Exchange-Rate Exposure of Dutch Firms. Journal of International Financial Management & Accounting, 17(1), 1-28.
- Jorion, P. (1990). The exchange-rate exposure of US multinationals. Journal of business, 331-345.
- Keloharju, M., &Niskanen, M. (2001). Why do firms raise foreign currency denominated debt? Evidence from Finland. European Financial Management, 7(4), 481-496.
- Khoo, A. (1994). Estimation of foreign exchange exposure: an application to mining companies in Australia. Journal of International Money and Finance, 13(3), 342-363.
- Kim, Y. S., Mathur, I., & Nam, J. (2006). Is operational hedging a substitute for or a complement to financial hedging?. Journal of corporate finance, 12(4), 834-853.
- Kiymaz, H. (2003). Estimation of foreign exchange exposure: an emerging market application. Journal of Multinational Financial Management, 13(1), 71-84.
- Marshall, A. P. (2000). Foreign exchange risk management in UK, USA and Asia Pacific multinational companies. Journal of Multinational Financial Management, 10(2), 185-211.
- Miller, K. D., &Reuer, J. J. (1998). Firm strategy and economic exposure to foreign exchange rate movements. Journal of International Business Studies, 29(3), 493-513.
- Muller, A., & Verschoor, W. F. (2006). Asymmetric foreign exchange risk exposure: Evidence from US multinational firms. Journal of Empirical Finance, 13(4), 495-518.

- Nguyen, H., & Faff, R. (2003). Can the use of foreign currency derivatives explain variations in foreign exchange exposure?: Evidence from Australian companies. Journal of Multinational Financial Management, 13(3), 193-215.
- P.A. Collier E.W. Davis J.B. Coates S.G. Longden, (1992),"Policies Employed in the Management ofCurrency Risk: A Case Study Analysis of US and UK", Managerial Finance, Vol. 18 Iss 3 pp. 41 - 52
- Pantzalis, C., Simkins, B. J., & Laux, P. A. (2001). Operational hedges and the foreign exchange exposure of US multinational corporations. Journal of International Business Studies, 32(4), 793-812.
- Shin, H. H., &Soenen, L. (1999). Exposure to currency risk by US multinational corporations. Journal of Multinational Financial Management, 9(2), 195-207.
- Sirpal, R. (2009). Methods of payment and foreign-exchange risk management among firms in Brunei Darussalam. The Journal of Risk Finance, 10(4), 377-392.
- Stanley, M. T., & Block, S. B. (1980). Portfolio diversification of foreign exchange risk: an empirical study. Management International Review, 83-92.
- Tranfield, D., Denyer, D. and Smart, P. (2003), “Towards a methodology for developing evidence-informed management knowledge by means of systematic review”, British Journal of Management, Vol. 14 No. 3, pp. 207-222.
- Wei, K. D., & Starks, L. T. (2013). Foreign exchange exposure elasticity and financial distress. Financial Management, 42(4), 709-735.
- Williamson, R. (2001). Exchange rate exposure and competition: evidence from the automotive industry. Journal of financial Economics, 59(3), 441-475.
- Wilson, A., &Heitger, D. (2002). Accounting for hedges: foreign currency exposures. Balance sheet, 10(1), 33-38.
- Zhou, V. Y., & Wang, P. (2013). Managing foreign exchange risk with derivatives in UK non-financial firms. International Review of Financial Analysis, 29, 294-302.