

Hedging Foreign Exchange Risk: How Does it Work in Practice?

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DURING THE LAST TWO DECADES, there has been rapid growth in the use of financial hedging instruments (derivatives) by firms.* The growth in the use of financial instruments has been attributed to the increase in the degree of global involvement of firms and the greater volatility of foreign exchange (FX) and interest rates, and commodity prices. Firms tend to use financial instruments to hedge their strategic exposure.¹⁰ Strategic exposure can be taken to encompass all types of exposures.† It reflects the extent to which the firm's value and therefore the present value of its future cash flow, is likely to be affected by changes in FX and interest rates, and commodity prices.²⁴ Since managers may have different perceptions regarding the impact of financial price changes on the firm's value, they are likely to hedge exposure for different reasons.

The use of derivatives in corporate hedging decision has not always resulted in the expected (favourable) impact on the firm's value. Yet, sub-

* There has also been rapid growth in the types of financial instruments that are used for hedging. The volume of trade for individual instruments is also substantial. For example, in a normal day, the volume of FX contracts associated with hedging "genuine trade", e.g., exports and imports, in London is about 2% of the U.K.'s gross domestic product (*Sunday Times*, 20th September, 1992).

† The literature has traditionally identified three types of exposures. These are: (i) translation/accounting or balance sheet exposure; (ii) economic exposure; and, (iii) transaction exposure. Translation exposure arises because of the need to consolidate the accounts of the subsidiaries and other operations of the parent company at the year end for financial reporting purposes, while economic exposure arises because of the potential impact of FX rate changes on all future cash flows. Transaction exposure is part of economic exposure except that it arises in the immediate short-term. Strategic exposure encompasses long-term economic exposure and focuses on all the operations of the firm.^{9,24}

This article presents a brief discussion of the motives for hedging strategic exposure and relates the theoretical work to a practical situation. The theory suggests that strategic exposure management can have a favourable impact on the firm's value. In practice, firms may pursue a limited number of hedging motives and the organisational arrangements within firms can have important impacts on the extent to which specified hedging motives can be pursued. © 1999 Elsevier Science Ltd. All rights reserved

stantial economic losses can be incurred if the potential impact of FX risk is ignored.‡ There is generally a strong view among both finance managers and market analysts that FX exposure should be hedged. However, some executives have expressed concerns about the amount of time corporate treasury staff devote to hedging activities.⁷ Indeed, risk management is seen as one of the most important financial decisions facing executives.²⁴ It has important implications for the global competitiveness of firms.⁹

The academic literature lacks both a practical

‡ Laker Airways and Metallgesellschaft are two notable examples of firms which pursued distinctly different corporate hedging strategies that resulted in substantial economic losses. Laker Airways was exposed to the volatility of the U.S. dollar but pursued a *no* hedge strategy. This resulted in significant economic losses and default on loans which in 1981 was over U.S.\$400 million.²⁵ In contrast, Metallgesellschaft's use of futures and swaps to hedge oil contracts resulted in losses of over U.S.\$1 billion and the need for an emergency line of credit (*Financial Times*, 16th November, 1994).

framework for implementing corporate hedging decisions and clarity about the potential impact of hedging* on the firm's value. This problem can be partly attributed to a general lack of understanding of exactly how exposure is measured within firms and the strategies firms pursue in practical hedging situations. For example, a firm may restructure its balance sheet as well as utilise hedging instruments to manage its exposure. The decision variables considered by the firm for such hedging actions are not readily observed by external parties. Yet, when researchers attempt to measure the firm's exposure, they usually proceed by testing the sensitivity of the firm's stock returns to FX rate changes.¹³ It is not clear whether the results obtained by researchers necessarily indicate exposure or lack of exposure, nor, successful or unsuccessful hedging strategies†. It may well be that stock prices do not capture the short-term impact of hedging. Despite the fact that most firms hedge, there is insufficient empirical evidence to suggest that FX risk is priced in the stock market.¹¹

This article reviews the theoretical work on corporate hedging motives and employs a case study to illustrate the extent to which the issues considered are applied in a specific firm. We use this approach for the following reasons. Firstly, we want to link the theoretical work with exposure management practice in order to identify areas of agreement. Also, by addressing the risk management problem from the perspective of both *stakeholders* and the firm, we hope to identify potential areas of conflict. In practice, we know very little about the hedging activities of shareholders.

Secondly, we hope that our evaluation of current research will generate some debate among both academics and practitioners so that a better framework for addressing the corporate hedging problem can be adopted. We believe that both accountants and finance managers have important roles to play in this context because of their familiarity with the financial (exposure) reports used in corporate hedging decisions. Indeed, up to 74% of U.K. treasury managers have been shown to have had previous occupations either as finance managers or as professional accountants.¹² We hope therefore that our review and

discussion will shed further light on the problems of hedging strategy. We do not suggest that the exposure management practices of the firm which we will consider are the same for all other firms.

Theoretical Considerations

The traditional arguments against corporate hedging largely reflect Modigliani and Miller's (M&M's) irrelevance proposition²² and modern portfolio theory (MPT). While M&M's proposition suggests that financial policy is irrelevant where there are no taxes and no transaction costs, etc., MPT suggests that if FX risk is unsystematic, it can be diversified by investors. The motives for hedging are briefly discussed below under broad sub-headings. To keep this article to a reasonable length, we have cited the main theoretical studies.

Home-Made Hedging

Following the implications of M&M's work, shareholders can obtain *home-made hedging*, thereby making hedging by the firm irrelevant. This means that every investor would be able to hedge his/her own exposure in the firm at the same (or lower) cost as the firm. However, market-based hedging instruments are traded in minimum sizes which are too large to be used by ordinary investors. The initial margin requirements and daily settlement arrangements of the futures markets can also cause substantial cash flow and liquidity problems for investors. Furthermore, investors may be unable to determine the firm's exposure through the use of published financial reports, unless the firm's exposure to FX risk is reflected in its share price.

Risk Diversification

The arguments based on MPT assert that unsystematic risks are diversifiable and only systematic risk matters. Investors would therefore only be concerned about the additional risk that an asset or liability contributes to their (already) efficiently diversified portfolios. The reason is that in efficient capital markets, corporate hedging is redundant since shareholders can diversify the FX risk at the same (or lower) cost as the firm. Whether or not FX risk is systematic or unsystematic the firm's value should not be affected since the stock market would have already impounded the FX risk into its share price.¹⁶ The literature also suggests that investors can reduce the risk of their domestic portfolios by investing in foreign securities. However, there are problems in gaining access to foreign stock markets and in dealing with the risks associated with foreign investments.¹⁴

* Froot *et al.* assert:⁹ "finance theory does a good job of instructing firms on the implementation of hedges... Unfortunately, finance theory has had much less clear cut guidance to offer on the logically prior questions of hedging strategy".

† On failing to find a significant contemporaneous relationship between abnormal stock returns and FX rate changes, Bartov and Bodnar concluded that investors do not use all freely available information to predict the firm's future value in terms of changes in FX rates.³ In contrast, Cassidy *et al.* used "event study" methodologies to show that investors respond positively to news about the expansion of the risk management departments of U.S. (insurance) firms,⁵ implying that investors value firm-specific risk management activities.

Risk Aversion

Stulz argues that while external shareholders can diversify their risk, the firm's managers can protect their own wealth more cheaply by hedging the firm's value.²⁹ Hedging also increases the firm's value by reducing the amount of compensation required by managers, employees, suppliers and customers for bearing non-diversifiable risk. If hedging is costly, shareholders can devise managerial compensation plans which discourage corporate hedging.²⁹ To be effective, shareholders would have to devise compensation plans which incorporate incentives to attain the desired effect.¹⁷

Information Asymmetry

If firms hedge to improve the information content of earnings as a signal about managerial ability and product quality, then hedging is the equilibrium policy since managers have more information about the sources and magnitude of the firm's risk.⁶ As managers have more accurate expectations about the firm's exposure than shareholders,² the maximisation of managers' expectations would also maximise the firm's value. Mello *et al.* also demonstrate¹⁹ that the firm's value will be maximised if the firm's production plans depend on the firm's hedging strategy.

Taxation

The firm will also have an incentive to hedge the more convex the tax schedule and the more volatile the firm's before tax earnings.²⁶ Tax preference items can also cause the tax schedule to become (more) convex. Hedging is therefore likely to reduce the variability of the firm's profits as well as the probability that the firm will encounter financial distress. Stakeholders would benefit economically since hedging is likely to reduce the probability that the firm incurs bankruptcy,²⁶ reorganisation or social costs. Following the capital asset pricing model (CAPM), a reduction in the variability of the firm's returns while leaving their expected level unchanged, should have little or no effect on the firm's value. Further, if forward contracts are priced according to the CAPM and FX risk is systematic, hedging would only move the firm along the security market line without any accompanying increase in its value.

Agency Costs

Corporate hedging can reduce the potential for the redistribution of wealth from shareholders to bondholders if it makes the firm less risky.²³ Here, hedging would appear to reduce the agency problem by reducing the variability of the firm's cash flows. Smith and Warner argue that the agency problem can also be reduced by issuing convertible debts rather than straight debts.²⁷ Bessembinder shows that hedging reduces the incentive to under-invest by reducing the sensitivity of high priority claims on the benefits of

incremental investments.⁴ Hedging is only irrelevant when financial markets are integrated and investors are homogeneous.²¹ The inclusion in the general model of differentials in taxation, inflation and interest rates results in value-maximising decisions where financing and investment decisions are independent and corporate hedging has value. Thus it is suggested that hedging is desirable since it lowers the external financing costs which are associated with capital market imperfections.⁸

Other Considerations

On the assumption that the firm hedges, the full benefit of hedging would only arise if exposure management policy was implemented on a global basis. Most normative models argue for a centralised rather than a decentralised treasury management function.^{1,28} However, centralisation is likely to lead to a loss of initiative by subsidiary managers since it can affect performance evaluation criteria. Melumad and Reichelstein's model suggests²⁰ that the firm can exploit information for decision making if it elicits information from its subsidiaries or delegates information to them. However, given the high degree of uncertainty in global markets, there are still likely to be significant problems of operation control.

Exposure Management Practice: A Case Study

Background

X incorporated is a U.S. multinational corporation with an annual turnover of about U.S.\$6 billion. X manufactures computer and electronic office equipment in the U.S. and three European countries. Its products are sold in over 100 countries. European sales account for over 60% of the firm's annual turnover. The industry in which X operates is research intensive and very competitive. X has fully-owned subsidiaries in over 20 foreign countries. The products for sale are imported from the manufacturing units. The sales units/subsidiaries have responsibility for marketing and distribution. Imports are generally priced in U.S. dollars and sold in local currencies. The local costs of subsidiaries and other operating units, include administration, salaries and wages, distribution and marketing.

Treasury Centralisation and Corporate Hedging Strategy

During the early 1980's, X established a centralised treasury function with responsibility for implementing its hedging policy. X's corporate hedging policy was formalised. It specified that both economic (including transaction) and accounting/balance sheet exposure should be hedged. The motive for hedging was to reduce the impact of FX rate fluctuations on

X's market value, thereby ensuring that U.S. shareholders' wealth would not be adversely affected by FX rate changes. Specific clientele effect* considerations in hedging policy were ignored as were considerations related to minority interest, and the welfare (and knowledge-based skills) of employers and employees. X's managers were very certain that their main concern was the potential impact of FX fluctuations on the wealth of U.S. shareholders at large. This view was documented in the firm's FX policy manual and was supported with illustrations of the potential value which could be added to shareholders' wealth if the hedging policy which was put forward was followed. It was believed that the management of all FX risk would provide added value to shareholders. Consequently, all FX exposures which were identified were hedged against the U.S. dollar. X's accounting exposure was defined as the projected net financial asset, i.e., current assets less all liabilities, over the identified exposure horizon. Financial distress and agency costs were very minor considerations in hedging decisions since X had substantial liquid cash. Also, little consideration was given to the possibility that customers were likely to demand more substantial guarantees for X's products due to the potential impact of FX risk. Interestingly, the products supplied often included associated service contracts for periods in excess of three years. The FX policy of X was noted in the published accounts and gains/losses were reported in accordance with FASB No. 52.

Reporting Procedures and Policy Implementation

The identification of X's main hedging motive also required establishing set procedures to ensure that the FX policy was followed. This meant that the corporate treasury function had to establish standard formats for reporting exposures and procedures for identifying those items which should appear in the exposure reports. Where appropriate, a forecast income statement and balance sheet were submitted by each subsidiary/operating unit. These were submitted on a monthly basis. Dividend and royalty payments to the parent were also included in the income statement and inter-affiliate merchandise payments and receipts were reported separately within the groups' inter-company netting system. All exposure reports were submitted to the centralised corporate treasury function in order to hedge X's global exposure. Exposures which unexpectedly arose between reporting periods were also reported to the

corporate treasury function for immediate action, if they were significant. In addition, the corporate treasury function regularly evaluated the exposure measures and corporate hedging policies and strategy, in order to accommodate changes in X's competitive position. This included the use of both regression and correlation analyses. The regression coefficients were used as indicators of the sensitivity of the exposures of subsidiaries or operating units to FX rate changes. The statistical results often provided support for hedging. Where the currencies were found to be highly correlated, the exposures for those operating units were hedged on a consolidated basis, in a selective manner.

X typically used 3-months FX forward contracts to hedge FX exposures. FX contracts of shorter maturities were used only when the cash flow from the underlying exposure or related exposure was certain. Conversely, FX forward contracts of longer maturities (6-months or more) were avoided because of the greater uncertainty of the cash flows from the exposure and the potential for greater divergence between the forward rates of longer maturities and the realised spot rate†. Both aspects were likely to increase the variance of X's cash flow and adversely affect liquidity. Thus there was a strong preference for rolling over shorter maturities since this reduced the degree of uncertainty in cash flow.

Corporation Tax and Other Implications

Finance theory emphasises a very important role for hedging when the firm's tax schedule is not constant and income is volatile. Tax is therefore identified as a motive for hedging. In the case of X, the tax differentials of various countries and differences in the profitability of operating units would imply that taxation would be an important consideration in its hedging strategy. However, the tax issues which were considered by X seem to follow primarily from the consequences of hedging. Indeed, taxation did not initiate hedging but became important when the decision to hedge was made. X's approach was to consider tax-related issues on a case-by-case basis. The U.S. tax code required the predetermination of ordinary and capital FX transactions at the inception of the FX contract. This created significant problems in tax planning and limited the ability of X to offset certain capital gains and losses. The rules which determine how losses can be carried forward or backward also impeded efficient tax planning. X often avoided hedging exposures where section 1256 rules applied. The U.S. inland revenue code 1256 applies to certain broad-based hedging instruments including

* In a related case study, Lewent and Kearney¹⁵ also suggested that it was difficult to incorporate clientele effect considerations into hedging policy because of the diverse hedging requirements of shareholders.

† The economic loss and liquidity problems of Metallgesellschaft¹⁸ have been partly attributed to the mismatch between the futures maturity structure and the cash flow at delivery.

FX contracts which are denominated in certain currencies. When applying the rules, section 1256 contracts have to be marked-to-market at the end of each financial year and the gains or losses arising from those contracts have to be treated as 60% long-term and 40% short-term capital gains or losses. The existence of section 1256 contracts, introduced further uncertainty into X's tax planning. The difficulties of determining the tax consequences of hedging decisions meant that certain hedging strategies were not implemented consistently. As there were difficulties in tax planning, local managers' views regarding the impact of tax on hedging strategy were not always consistent with that of the corporate treasury function. In certain situations, the tax effect was unfavourable since it was included in managers local performance measures and incentive schemes. Interestingly, it turned out that the overall tax burden of X was often greater than those of its competitors.

Although X hedged most of its exposures internally, the balance of the exposures which were hedged in the FX market was still substantial. For example, the total value of FX forward contracts for the first eight months of 1992 was U.S.\$3.2 billion. X's strategy was to hedge all exposures in excess of U.S.\$2 million but there was some flexibility in the way this policy was applied. Since balance sheet exposures do not generate underlying cash flows, X's accumulated translation adjustment (ATA) account exhibited FX loss of several million U.S. dollars during the late 1980's and early 1990's*. The problem was exacerbated by *ad hoc* tax-effecting strategies. The significant loss on the ATA account was of serious concern to corporate managers. There were occasions when corporate treasury raised the threshold at which balance sheet exposure was hedged in an attempt to avoid the impact of the premium/discount when settling FX forward contracts. As expected, the strategy of hedging accounting exposure reduced the volatility on the reserves account at the expense of increased volatility on the firm's overall cash flow.

The form of exposure reporting also appeared to have had a significant impact on the corporate hedging strategy. The local managers of subsidiaries had full responsibility for identifying and reporting local exposures. They were allowed to identify exposures over the time horizons they considered appropriate for their individual operations. For example, one manufacturing subsidiary identified exposure over a 15-month period, but exposure horizons of 6- or 12-months were the norm, irrespective of the nature of the unit's operations. Since local managers had full

responsibility for identifying exposure and FX gains or losses were incorporated in their performance measures, the amount of exposure reported often reflected their views about developments in the FX market. Thus, local managers sometimes reported a lower (higher) level of exposure based on their expectation of changes in FX rates. Indeed, since the amount of exposure and its nature were determined locally, it is possible that X was not always fully hedged.

Conclusion

This article has focused on two important aspects; (i) the theoretical motives for hedging strategic exposure; and, (ii) the relevance of corporate hedging motives in practice. The theoretical section of the article focused on the reasons why firms may hedge. As many of the motives for hedging are interrelated, it is possible that a firm would focus on one or two motives. The main hedging motive of X was to reduce the impact of the FX rate fluctuations on its future cash flows and net financial asset. Since X was very liquid, financial distress was a minor consideration in its hedging decisions. This behaviour is consistent with recent empirical work.¹² The case study also shows that the motive for hedging was linked with the desire to maximise shareholders' wealth. The implicit assumption was that all X's shareholders had the same degree of risk in their portfolios and that the managers were better informed of the firm's exposure than the shareholders. In this case, the managers' perceptions regarding shareholders' exposure to FX risk and the potential impacts of changes in FX rates, were used to formulate X's hedging strategy. The case study also illustrates the problems which can arise when implementing a specific hedging strategy. When exposure information is generated locally, it is essential to establish an exposure strategy which does not adversely affect measures used to evaluate managers' performance. Alternatively, action should be taken to reduce the adverse impacts on performance-related measures. Otherwise local managers may pursue dysfunctional activities. Also, the corporate hedging policy should be applied to all the organisational units of the firm. Hedging policy can only be effective if all the organisational units agree on the hedging strategy.

Firm's managers also have discretion over the means by which information regarding hedging policies can be communicated to various interested parties. This discretion can be used to signal the managers' private information about the firm's financial performance. Indeed, the case study suggests that the managers believed that they had more accurate information about the firm's exposure than the shareholders. Also, they used that information to seek to maximise the firm's value.²

* It is worth noting that when accounting exposure is hedged, the gain or loss on the FX contract does not exactly offset the loss or gain on the exposure because of the premium or discount on the forward contract.

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