

Strategic Management of Operating Exposure

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We identify operating exposure as the most important and difficult to manage component of exchange risk. Our model identifies three components of foreign exchange exposure: direct operating exposure, the market demand effect, and the competitive effect. The size and relative importance of these components depends critically upon international market structure and firm strategies. We derive implications for managing foreign exchange exposure.

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Internationalization of the economies of most nations has meant that companies are increasingly subject to the risk associated with exchange rate movements. Despite consensus over the importance of exchange rate risk, the ability of companies to effectively manage these risks has been limited by confusion over the definition of such risk and the appropriate tools for managing exchange rate risk. In terms of both defining and controlling exchange rate risk, a fundamental distinction is between **accounting exposure** and **economic exposure** (Lessard and Lightstone, 1986; Oxelheim and Wihlborg, 1987). Accounting exposure arises from the need to report the firm's financial condition and results in a common currency. The financial statements of foreign operations are converted from the local currencies involved to the reporting currency.¹ Accounting exposure is the variance in the book value of the firm resulting from changes in the home currency value of foreign currency-denominated assets and liabilities. Although accounting exposure has received considerable attention in the international finance literature, its relevance to managerial decision making is doubtful. Since management's goal is supposedly to operate in the interests of its owners by maximizing the market value of the firm, the basic problem with accounting exposure is that book values bear little relation to shareholders' wealth maximization.

From the viewpoint of the wealth-maximizing firm,

economic exposure, defined as the 'sensitivity of a firm's economic value to changes in the exchange rate' (Oxelheim and Wihlborg, 1987), is the relevant exchange rate risk. Since the market value of the firm is the discounted value of net cash flows to the firm, the critical issue in determining economic exposure is establishing the impact of exchange rate movements on net cash flow. Economic exposure comprises two components: **transaction** and **operating exposure**. Transaction exposure is the fluctuation in the home currency value of foreign currency-denominated contracts for which the price has been fixed. Operating exposure is the fluctuation in future operating cash flows (whether denominated in home or foreign currencies) in response to variations in real exchange rates. For most firms, operating exposure is a far more important source of risk than transaction exposure. While transaction exposure is short-term, relating to the period between entering and settling contracts, operating exposure affects any firm with foreign buyers, suppliers or competitors (or whose **domestic** suppliers or customers have foreign suppliers, buyers or competitors) through its impact on sales revenues and input costs. Operating risk arises not only because revenues and costs are denominated in different currencies (**direct operating exposure**), but also from the fact that costs of competing firms are in different currencies (**competitive operating exposure**).

While techniques for managing accounting and transaction exposure are well-established (see, for instance, Soenen, 2000), approaches to managing operating exposure are less developed. Actually, this short-term focus on foreign exchange management has been documented in the Wharton Survey of Derivatives Usage by US Non-Financial Firms. Bodnar *et al.* (1996) report that firms worry most about the impact of financial risk on current cash flows and less about distant cash flows. However, the more fundamental question of preserving the firm's overall earnings potential requires a long-term view of exchange risk management. Management needs to concentrate on the management of the firm's operating exposure. An important feature of manag-

ing operating risk is its strategic character, because operating risk is associated with a stream of transactions rather than individual transactions, the time horizon for hedging extends beyond that provided by conventional hedging instruments. As a result, managing operating exposure raises organizational issues. The strategic aspect of exchange risk management means that it cannot be relegated to the firm's treasury department. Managing exchange rate risk becomes a general management issue.

The purpose of this paper is to investigate the determinants of operating exposure arising from unpredictable foreign exchange movements. We place particular emphasis on the relationship between market structure and operating exposure. While the competitive structure of international markets has been generally recognized as important in determining the extent and characteristics of exchange rate risk, there has been little in the way of systematic analysis of the relationship between market structure and exchange rate risk. Having analysed the determinants of operating exposure, we then develop a set of propositions concerning the management of these risks. Our research contributes to the analysis and management of exchange risk in two ways. First, it provides an analysis of exchange rate risk that incorporates a range of different market structures and assumptions about pricing policy and, in doing so, extends the work of Von Ungern-Stenberg and Von Weizsacker (1990) and Luehrman (1990). Second, it links the analysis of exchange rate risk to strategies for managing this risk.

Before analysing the determinants of operating exposure and drawing predictions for its strategic management, let us first explain the importance of a strategic approach to managing operating exposure by discussing the shortcomings of conventional hedging procedures.

Inadequacies of Financial Hedging

The international financial literature is increasingly coming around to the view that, for the purpose of managing economic exposure, conventional hedging techniques are of dubious value, and may even be value-reducing (Lessard and Lightstone, 1990; Grant and Soenen, 1991). There are four main arguments here:

The Dangers of Incomplete Hedging

Conventional approaches to exchange risk management focus upon hedging against accounting and

transaction exposures, but such techniques provide no solution to operating exposure. For example, forward purchases of yen by General Motors to cover its payments for car imports from Japan provide a hedge for GM's transaction exposure but not against operating exposure. Any persistent change in the value of the yen relative to the dollar changes GM's competitive position *vis-à-vis* its Japanese rivals thus impacting GM's cash flows. Indeed, in this case, hedging transaction risk exacerbates GM's operating exposure to yen/US dollar volatility. GM's sourcing of cars in Japan provides a partial operating hedge against changes in its competitive position in the US market relative to Japanese automobile makers. By hedging its yen position, GM defeats that natural hedge, in the short term at least.

Similarly, hedging accounting exposure by means of financing foreign assets in the local currency may increase operating exposure. The subsidiaries of the Royal Dutch/Shell Group are financed mainly by dollar loans. Since the currency of reporting is the British pound and the Dutch guilder, any appreciation in the dollar causes a translation loss. However, the economic exposure of the Group is not determined by the currency of denomination of its assets but by the currency

of price determination for the products generated by the assets. As the prices of oil and oil products are set in US dollars, financing foreign activities with dollar loans helps to hedge operating exposure: debt servicing in dollars partly offsets dollar-denominated revenues. Financing in any other currency might reduce accounting risk but would create operating exposure.

Operating risk may exist where the firm has no accounting or transaction exposure, and may even arise where a firm has no international transactions. Harley Davidson Inc. has limited international activity, nevertheless, a major determinant of its competitive position relative to its Japanese rivals is the yen/US dollar exchange rate. As we shall see, for many firms this **competitive exposure** is the main component of operating exposure.

Nominal Versus Real Exchange Rate Movements

One of the oldest theorems in international finance, purchasing power parity (PPP), implies that gains or losses from exchange rate changes tend over time to be offset by differences in inflation rates. If a company's revenues and expenses increase in accordance with the general price level, real profits should be left unchanged, making exchange risk unimportant in the long run. Hence, conventional financial hedging against operating risk encounters the problem that the relevant exchange rate for hedging operating

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exposure is the **real** exchange rate. If nominal exchange rates adjust to offset differences in inflation rates between countries — thus maintaining purchasing power parities — then operating exposure is non-existent and hedging is unnecessary. Because nominal exchange rate movements are closely correlated with inflation rates, real exchange rates are far more stable than nominal rates. So long as the company makes purchases and sales on a spot basis and avoids long-term contracts fixed in terms of foreign currencies, operating risk is modest. However, by attempting to hedge nominal exchange rates, that company would open itself to considerable risk.

There is an extensive empirical literature (for instance, [Roll, 1979](#) and [Protopapakis and Stoll, 1983](#)) that documents deviations from PPP, i.e. changes in the real value of currencies. [Adler and Lehman \(1983\)](#) and [Abuaf and Jorion \(1990\)](#), among others, have reported significant long run deviations from PPP. Hence, if the firm's planning horizon is shorter than what is needed for PPP to hold, the firm is exposed to exchange risk. The firm's relative competitive position changes as changes in the nominal exchange rate are not offset by the difference in inflation rates between the two countries. The firm must, therefore, cope with risk arising from both changes in the general price level and in relative prices of specific inputs and outputs. Since financial derivatives exist in individual commodities but not in a representative basket of goods and services, it is not easy to hedge against changes in real exchange rates.

The Problem of Undefined Transactions Extending Long Into the Future

The ability of the firm to use financial instruments to hedge cash flows runs into the problem that the financial instruments are specific with regard to amount and timing, while cash flows are uncertain and extend far into the future. The use of short-term hedging instruments to hedge continuous cash flows does not reduce operating risk, it simply lags it by the period of the hedge. In general, hedging is not useful for activities for which the firm's planning and action horizon extends beyond that of the hedging instrument. Consider a US firm that is always importing finished products from Japan for distribution in the US. Assume that the yen-payables are on terms net 30 days. Here, the firm is faced with a continuous cash outflow denominated in yen. A financial hedge consists of buying yen forward, going long in yen futures, buying yen calls or writing yen puts, or creating a yen deposit. As the exposure is long term, one would have to repeatedly roll over the hedge. When the yen appreciates against the US, as has been the case since mid 1985, both spot and forward rates will rise. Each successive forward yen

purchase comes at a higher dollar price, making the relief provided by hedging at best temporary and at worst illusory ([Soenen, 1991](#)). To the extent that forward exchange rate is an unbiased estimator of the future spot rate, if we enter into a financial hedge or not, the firm will on average end up with the same exchange rate, that is the actual future spot rate. Although the financial hedge takes care of the short-term exposure (i.e. transaction exposure), repeated hedges do not reduce the exchange risk for the firm in the long run.

Risk Hedging and Shareholder Value

Finally, in a world of efficient currency and securities markets there is doubt as to whether any kind of hedging activity creates value for shareholders. If shareholders can hold internationally-diversified portfolios, or if they themselves can hedge the exchange risks associated with their shareholdings, then there is no reason why hedging creates value for the shareholder. Stated in terms of the capital asset pricing

“...repeated hedges do not reduce the exchange risk for the firm in the long run”

model, if share prices are determined by a firm's expected return and its non-diversifiable (systematic) risk, then activities such as exchange rate hedging which only reduce diversifiable (unsystematic) risk, do not increase the share price. Indeed, to the extent that hedging activities by firms incur administrative and financial costs in excess of the cost of comparable hedging activities by institutional or individual investors, then hedging by a company actually reduces its market value.

Once we introduce imperfections into financial markets, then these arguments do not necessarily hold. Suppose a firm faces a borrowing constraint. An adverse movement in the exchange rate that is sustained over several years may permanently impair a firm's competitive position. Consider the weighted average of the foreign exchange value of the US dollar against the currencies of a broad group of US trading partners ([Figure 1](#)).

Over-valuation of the US dollar (relative to its PPP rate of exchange) extending from 1980 to 1985 depressed the net cash flows of many export-dependent US firms. For some, accompanying loss of market share and reduced investment in R&D and facilities may also have had a permanent impact on future cash flows. For instance, Caterpillar, the leading maker of earthmoving equipment, was driven to the brink of bankruptcy at that time because of the strength in the US dollar versus the yen (especially [Komatsu](#)) and European currencies ([Poclain](#), [Liebherr](#)). In the same way, the current strength of the British pound has made it very hard for any manufacturer in the UK to compete in the global arena. This was recently announced by several lead-

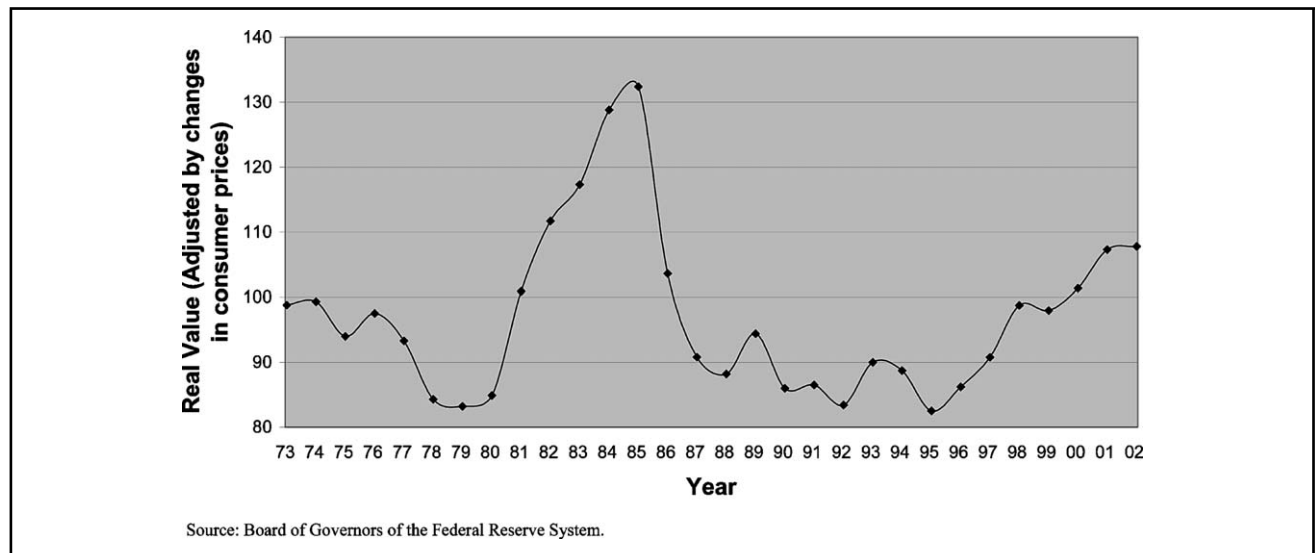


Figure 1 Multilateral Trade-weighted Value of the US Dollar (March 1973=100)

ing Japanese firms, i.e. Toshiba has described the level of sterling as 'unbearable' and warned its continued strength could force the closure of its last UK manufacturing base (Ibison and Brown, 2000). In the same Financial Times article, it is reported that Komatsu, the construction equipment manufacturer said that it was considering siting a new plant in the euro-zone instead of the UK, while Nissan recently urged the British government to move towards euro-membership.

Moreover, even if it is possible for shareholders to control exchange rate risk by means of holding internationally-diversified portfolios, such diversification opportunities may not be available to other stakeholders — including employees, distributors, customers and suppliers. However, this assumes that economic exposure is idiosyncratic and not systematic. Only then should a company remain un-hedged because stockholders can effectively diversify away the risk by holding a broadly diversified portfolio. It remains an unanswered question whether economic exposure to exchange risk is idiosyncratic or systematic. If economic exposure is a determinant of a firm's systematic risk, then the measurement, management of, and hedging of this risk is of concern to stockholders.

Determinants of Operating Exposure

The value of the firm is the sum of the present values of its expected future net operating cash flows converted to the home currency. These operating net cash flows correspond to net profits from operations: operating profits net of interest and tax, but including depreciation and other accounting items not involving actual cash flows. We shall refer to net operating cash flows as 'profits'. Thus the present value of the firm at time 0, V_0 , is given by:

$$V_0 = \sum_{t=0}^T \Pi_t r^{-t} \quad (1)$$

where T is the last (termination) period of the firm, r is the rate of discount over the period and Π_t is the net operating cash flow during period t , after conversion to the home currency.

We have defined economic exposure as the sensitivity of a firm's net operating cash flows to movements in the exchange rate between its home currency and foreign currency i . Following Hodder (1982) and Oxelheim and Wihlborg (1987), we can measure this exchange rate risk in a manner analogous to the way in which the capital asset pricing model measures asset risk. The firm's cash flow comprises a portfolio of cash flows in different currencies. The contribution of exchange rate fluctuations to fluctuations in the firm's cash flow can be measured as the covariance between the exchange rate (e_{it}) and the net cash flow (Π_t) relative to the variance of the cash flow:

$$\frac{\text{cov}(e_{it}, \Pi_t)}{\text{var}(\Pi_t)} \quad (2)$$

where e_{it} is the exchange rate of currency i in terms of the home currency at time t .

However, equation (2) simply defines economic exposure and provides a formula for its estimation. In order to identify methods for managing risk, we need to understand the covariance between e_{it} and Π_t , i.e. the relationship between changes in the exchange rate and changes in net cash flows, that is:

$$\frac{\Delta \Pi_t}{\Delta e_{it}} \text{ which, in the limit, } = \frac{d\Pi_t}{de_{it}}$$

Note that our definition of economic exposure

includes both transaction and operating exposure, i.e. net cash flow (Π) includes both contractual and non-contractual transactions. To focus attention on operating exposure, we shall assume that all transactions are non-contractual.

Since net cash flow in each equals revenues less costs, the key issue is to determine how exchange rate changes influence the margin between revenues and costs. Thus, ignoring taxes, profit in period t in terms of the home currency may be expressed:

$$\Pi_t = \sum_i (p_{it} \cdot q_{it} - c_{it} \cdot q_{it}) e_{it} \quad (3)$$

where q_{it} is the quantity of goods sold in period t denominated in currency i ; p_{it} is the unit price charged for goods sold during time period t denominated in currency i ; and c_{it} is the cost per unit of output incurred in currency i during period t .

The demand function facing the firm relates the quantity of goods sold to the price set by the firm and the prices set by other firms (p'_{it}). Following Henderson and Quandt (1971), we dichotomize the impact of price on quantity demanded into a **constant market share effect** that shows the effect of changes in the firm's price where the price differential with competitors remains constant, and a **market share effect** which shows changes in quantity demanded arising from changes in price differentials causing shifts in market share.

$$\Delta q_{it} = Q_{it} [\Delta p_{it}, \Delta(p_{it} - p'_{it})] \quad (4)$$

where p'_{it} is the price charged by competitors in country i .

The impact of a change in the value of currency i on the firm's profits can be found by taking the partial derivative of equation (3) with respect to the rate of exchange, e_i (for simplicity, we shall ignore the time subscripts):

$$\frac{d\Pi}{de_i} = p_i q_i - c_i q_i + e_i \frac{\delta q_i}{\delta p_i} \frac{\delta p_i}{\delta e_i} + e_i \frac{\delta q_i}{\delta(p_i - p'_i)} \frac{\delta(p_i - p'_i)}{\delta e_i} \quad (5)$$

$$\frac{\delta \Pi}{\delta e_i} = \underbrace{p_i q_i - c_i q_i}_{\text{direct operating exposure}} + \underbrace{E_{q_i, p_i} E_{p_i, e_i} q_i + e_i \frac{\delta q_i}{\delta(p_i - p'_i)}}_{\text{market demand effect}} \cdot \underbrace{\frac{\delta(p_i - p'_i)}{\delta e_i}}_{\text{competitive effect}} \quad (6)$$

where E_{q_i, p_i} is the price elasticity of demand for the firm's sales in currency area i , and E_{p_i, e_i} is the elasticity of the firm's price in country i with respect to the domestic currency price of one unit of currency i .

The impact of exchange rate changes upon the profitability of the firm, therefore depends upon the following factors:

Direct Operating Exposure

The direct impact of exchange rate changes upon profit depends upon the extent of imbalance in the firm's cash inflows and outflows in each currency. Thus, consider the first two arguments in equation (6). If $(p_i q_i - c_i q_i) > 0$, the firm has a long position in currency i , implying that, in the absence of other factors, $d\Pi/de_i > 0$, i.e. a strengthening of the currency increases the firm's profits in terms of its own currency. This situation would exist for any firm which exports from its home base to another country. To a much smaller degree, it would also exist for a 'multi-domestic' firm — one that comprises independent national subsidiaries, each producing for its home market. To the extent that the subsidiary i is profitable, an increase in currency i 's exchange rate has no effect upon the subsidiary's profits as measured in currency i , but they are converted to the home currency at a higher rate.

Where $(p_i q_i - c_i q_i) < 0$, the firm has a short position in currency i for period t implying that, in the absence of other factors, $d\Pi/de_i < 0$, that is, a strengthening of currency i reduces the firm's profits. This situation would exist for a company sourcing its products or raw materials from country i . The greater the proportion of the firm's costs incurred in country i , the greater is the reduction in profits from a rise in e_i .

The Market Demand Effect

The 'market demand effect' shows the impact of changes in price upon quantity demanded in the absence of any competitive effects. The starting point for predicting the direction and magnitude of this effect is examination of the impact of an exchange rate change upon the prices charged by the firm. This depends upon the pricing policy of the firm. To establish the range of E_{p_i, e_i} consider three situations:

1. If the firm is a price follower, where the price leaders are domestic suppliers, then, to the extent that domestic competitors are unaffected by changes in the exchange rate of their domestic currency, E_{p_i, e_i} can be expected to equal zero.
2. If the firm is a price leader, following cost-plus pricing, and is operated as a multi-domestic firm where each national subsidiary is a stand-alone entity, then all the costs of supplying products in country i are incurred within country i , hence, we can expect that $E_{p_i, e_i} = 0$.
3. If the firm is a price leader, following cost-plus pricing, and serves overseas markets by exporting from its home base, then any change in e_i will change unit costs (measured in currency i) by an equal and opposite proportion. Thus, $E_{p_i, e_i} = 1$.

We can therefore expect that $0 \geq E_{p_i, e_i} \geq -1$.

The impact of any change in price, assuming that all competing suppliers move their prices together, is determined by the constant market share elasticity coefficient ($E_{qi,pi}$), which is equal to the normal price elasticity of market demand. Since the elasticity of price with regard to the exchange rate is normally negative, and the price elasticity of market demand is also negative, the implication is that the market demand effect is positive (i.e. changes in exchange rates are positively correlated with changes in profitability, and the greater the elasticity of demand (in absolute terms) the greater is the impact).

The Competitive Effect

The competitive effect of an exchange rate change refers to the change in the firm's profit caused by a currency rate change affecting the competitive position of the firm relative to its rivals. Our model shows that the competitive effect comprises two terms: the impact of exchange rate changes upon price differentials, and the impact of changing price differentials upon sales as measured by the sensitivity of sales to relative prices. Let us consider each of these relationships separately.

- ❖ The impact of exchange rate changes upon price differentials

If we assume that prices are cost determined, then exchange rate changes will give rise to changes in price differentials between the firm and its competitors whenever the currency composition of costs is different between them.

$$p_i = (1 + g) \frac{\sum_i e_i c_i}{e_i}$$

and

$$p'_i = (1 + h) \frac{\sum_i e_i c'_i}{e_i}$$

where

c_i is the unit cost incurred in country i
 c'_i is the equivalent unit cost incurred by the firm's competitors in country i
 g is the cost markup used to determine price
 h is the equivalent markup used by competitors. Hence:

$$\frac{d(p_i - p'_i)}{de_i} = \frac{(1 + h) \sum_i e_i c_i}{e_i^2} - \frac{(1 + g) \sum_i e_i c'_i}{e_i^2}$$

We observe, therefore, that the direction and magnitude of the competitive effect depends upon the firm's allocation of its costs across currencies, compared to competitors' allocation of their costs. Consider the following situations:

- ❖ If the firm and its competitors incur equal allocations of their costs between country i and the rest of the world i.e. $\sum_i e_i c_i = \sum_i e_i c'_i$, then change in the exchange rate i leaves relative costs and relative prices unaltered i.e. $d(p_i - p'_i) / de_i = 0$.
- ❖ If the firm has less of its costs incurred in country i than its competitors i.e. $\sum_i e_i c_i < \sum_i e_i c'_i$, then an increase in the exchange rate of i tends to increase the firm's costs and prices relative to those of its competitors i.e. $d(p_i - p'_i) / de_i > 0$.
- ❖ If the firm has more of its costs incurred outside of country i than its competitors i.e. $\sum_i e_i c_i > \sum_i e_i c'_i$, then an increase in the exchange rate of i tends to decrease the firm's costs and prices relative to those of its competitors i.e. $d(p_i - p'_i) / de_i < 0$.

An implication of the competitive effect is that a firm with no direct involvement in international business can be vulnerable to operating exposure. The example given above of Harley Davidson's exposure to movements in the dollar/yen rate can be examined within this framework. Denote currency i as the Japanese yen. Harley Davidson has none of its costs in yen (i.e. $c_i = 0$). Assume that Japanese motorcycle manufacturers incur 75% of their costs in yen (i.e. $c'_i / \sum_i c'_i = 0.75$). A rise in the yen against the dollar will tend to raise the price of Japanese motorcycles relative to those of Harley, therefore, $d(p_i - p'_i) / de_i < 0$.

In reality, the situation is somewhat more complex. To fully examine the competitive effect of exchange rate changes we need to know, not only the currencies in which costs are incurred, but also how input prices are determined. Consider British Petroleum (BP) competing with Atlantic Richfield (Arco) in the California gasoline market. Arco's primary source of crude oil is Alaska, BP's production is more heavily concentrated in the North Sea. A depreciation of the British pound against the US dollar might be expected to give BP a cost and price advantage over Arco. However, because oil is an internationally traded commodity, it is priced in dollars worldwide, hence although oil companies differ in their sources of crude, exchange rate movements have only minimal effects upon competitiveness.

- ❖ The sensitivity of quantity demanded to price differentials

The extent to which an increase in the differential between the firm's price and that of competitors causes quantity demanded to fall depends upon market structure. The greater the number of competitors and less differentiated are their products, then the greater the sensitivity of demand to price differentials. In the case of a firm supplying a homogeneous product with many competitors, then the ratio elasticity of quantity demanded with respect to relative price might approach infinity, that is, the emergence of a small price differential might cause quantity

demand to drop to zero. Conversely, for a highly differentiated product in a concentrated market, the elasticity might approximate zero.

Table 1 summarizes the predictions of our model concerning the determinants of operating exposure to currency rate fluctuations.

Implications for the Strategic Management of Operating Risk

Before we can begin to identify strategies for managing operating exposure, we need to clarify companies' objectives with regard to exchange risk. The critical strategic choice for the firm is between **hedging** and **opportunism** with regard to exchange rate

variation. Hedging involves trading off reduced earnings variability against lower expected earnings caused by the cost of hedging. Opportunism is the quest for profit opportunities from exchange rate fluctuations, usually at the cost of a higher level of earnings volatility. We can expect the firm's strategic orientation with regard to currency risk as determined by top management's risk aversion, the total level of risk to which the business is subject, and the operational flexibility of the firm. Let us explore these three factors.

Ownership and Control

We argued above that, if securities markets are efficient, hedging exchange rate risk would not, in general, enhance the value of the firm. To provide a

Table 1 Summary of Predictions Concerning the Determinants of Operating Exposure

The impact of changes in exchange rate i upon the firm's profit (π) depends upon the following variables:

The Direct Exposure Effect	The firm's net cash flow position in currency i	The sign and the size of the impact of changes in exchange rate e_i depend upon the sign and size of the firm's net cash flow in currency i . The more country i is a market base for the firm, then the greater is the positive impact of any increase in e_i . The greater the extent to which country i is a production base for the firm, then the greater is the negative impact of any increase in e_i .
The Pricing Policy Effect	The pricing policy of the firm	The pricing policy of the firm influences the extent to which a change in exchange rate e_i results in changes in the firm's price in country i , p_i . In particular, whether the firm is a price leader or price follower, and if a leader, whether the firm sets a single world price, or price discriminates by country.
	The price elasticity of market demand	The greater the (absolute value of the) price elasticity of market demand for the firm's product, the greater the profit impact of any change in exchange rate e_i .
Market Structure Effects	Seller concentration in the market for the firm's product	The greater is seller concentration, the more sensitive is the firm's demand to changes in the price differential between the firm and its competitors, hence the more sensitive are profits to changes in exchange rates.
	The differentiation of the firm's product from those of competitors	The more a firm's products are differentiated from those of its competitors, the less sensitive is the demand for the firm's product to changes in price differentials, and hence, the greater the sensitivity of profits to changes in exchange rates.
The Competitive Effect	The currency composition of the firm's costs relative to that of competitors	The greater the similarity in the currency structure of costs of the firm and its competitors, the smaller the effect of exchange rates in changing the competitive position of the firm. The greater the proportion of costs denominated in currency i (relative to competitors), the greater the reduction in profits arising from a deterioration in the firm's competitive position.

rationale for risk aversion we need to assume either independence of managers from owners, or that securities markets are subject to imperfect information. The more dispersed is ownership, the greater is managerial independence. To the extent that managerial performance is measured in terms of short-term profit movements and downward movements have a bigger impact upon perceived performance than upward movements — then increased profit stability over time increases managerial utility. Alternatively, if managers do aim to maximize shareholder wealth, but securities markets overreact to new information and react particularly strongly to adverse news — then this also provides an incentive to managers to ‘smooth’ reported earnings. Hence, as a result of either mechanism, companies whose shares are listed on a stock exchange and/or which have widely distributed share ownership are more likely to hedge exchange rate exposure than companies with unlisted shares and/or with concentrated ownership.

The Firm’s Overall Level of Risk

Both for owners and managers, as the marginal cost of risk tends to rise, i.e. after a certain point, the firm requires steadily increasing amounts of additional return in order to compensate for additional increments of risk. Risk has numerous sources of which currency exposure is just one. Hence, a firm’s propensity to hedge exchange rate exposure is positively related to the level of risk it faces from market demand, competition, and technology.

The Costs of Flexibility

An opportunistic approach to exchange rate fluctuations requires that a firm is capable of adjusting its production and marketing activities in order to take advantage of movements in exchange rates. The greater is the capital intensity of production, the greater are scale economies and exit costs, and more established are customer relations in the firm’s markets, the more costly is the shifting of production and marketing activities between countries. Consequently, the more likely a firm is to adopt a hedging rather than an exploitation approach to currency fluctuations. In other words, a firm’s propensity to hedge currency exposure is positively related to the costs of geographical flexibility in production and marketing activities.

Hedging of direct operating exposure involves a balancing of a firm’s cash flows in each of the currency areas in which the firm operates. Such an approach is likely to be effective in reducing, even neutralizing, operating risk in situations where there is no conflict between direct hedging and hedging competitive risk. This is normally the case when in each country i that the firm markets in, competitors have their costs

denominated in currency i . This would mean either that competitors are all domestically-based, or that they are multinationals which pursue a multi-domestic strategy. The greater the globalization of the industry, the less effective is direct hedging likely to be. Hence, hedging direct operating exposure in the form of cash flow matching is most effective in international markets where competition is from domestically-based firms and/or multinational enterprises pursuing a multi-domestic approach.

To the extent that competitors within the same markets have costs comprised of different currencies, then exchange rate movements will change the relative costs of competitors. The essence of strategic hedging against competitive exposure, therefore, is for the firm to restructure its costs such that it matches the currency cost structure of its leading competitor(s). For companies facing global competition from overseas rivals, competitive risk represents the primary source of operating exposure, and hedging such exposure requires a firm to emulate the currency cost structure of its main competitors.

Our model predicts that operating exposure is positively related to the intensity of competition in a firm’s product market as indicated by the price elasticity of market demand, seller concentration, and product differentiation. Hence, the more competitive the firm’s product markets, the greater the level of operating exposure that the firm is subject to. Consequently, the firm may reduce exposure by pursuing strategies of product differentiation and relocating to less price sensitive market segments.

Our theoretical analysis points to a number of market structure variables which determine operating exposure, and these in turn, suggest several instruments for managing that exposure. For the sake of simplicity, we identify a small number of configurations of industry structure and risk orientation each associated with a distinct strategic approach. In terms of risk orientation, we have already identified two basic orientations: risk aversion that is associated with a hedging approach, and opportunism that is associated with a risk-exploiting approach. In terms of market structure, the critical distinction is between industries where competition is nationally fragmented (multi-domestic industries) and those where competition is global. Within these dimensions we can identify three distinct strategic approaches (see Table 2).

Conclusion

The analysis presented identifies economic exposure as the exchange rate risk relevant to the wealth-maximizing firm. Of the two components of economic exposure, operating exposure and transactions

Table 2 Strategies to Manage Operating Exposure: A Simple Classification

INTERNATIONAL MARKET STRUCTURE		
	Fragmented/multi-domestic	Global
RISK ORIENTATION	Hedging	❖ Hedging competitive risk through emulating the currency cost structure of competing firms. ❖ Hedging competitive risk through strategic alliances with competitors in different currency area. ❖ Reducing vulnerability to competitive risk through product differentiation and relocating in less price-sensitive market segments.
	Opportunism	Exploring profit opportunities arising from exchange rate fluctuations by means of shifting cost activities to countries with currencies below their PPP levels, and shifting revenue generating activities to countries with currencies above PPP levels.

exposure, for most firms operating exposure is the more important, and it is the more difficult to hedge. In particular, we show that conventional financial instruments for exchange risk hedging are ineffective in managing operating exposure.

We argue that management of foreign exchange risk does not necessarily involve risk reduction through hedging activities. As with any unpredictable variable impacting profits and returns, a firm can either pursue risk reduction or it can adopt an opportunistic stance by relocating its cost and revenue activities in response to movements in real exchange rates.

Our model identifies two primary components of operating exposure, i.e. direct operating exposure and competitive (or indirect) operating exposure. The relative importance of these two components depends upon the structure of international markets: where competition is nationally fragmented, direct operating exposure is most important; where competition is global then competitive exposure is of primary importance. More generally, market structure emerges as critical to the analysis of the sources and the extent of operating exposure. The firm's vulnerability to exchange rate movements depends upon the sensitivity of its prices to exchange rates and then on the sensitivity of its sales to price changes.

The analysis reveals clear predictions as to the strategies appropriate to managing operating exposures:

- ❖ In nationally fragmented markets, firms should seek to hedge direct operating exposure by matching costs and revenues,
- ❖ In global industries, firms should emulate competitors' currency cost structure,
- ❖ To reduce sensitivity to exchange rates firms

should differentiate their products and seek price insensitive market segments.

The central issue of exchange rate risk concerns the competitive position of the firm, and managing this risk is a strategic issue. The implication therefore, is that managing operating exposure is a general management responsibility that cannot easily be delegated to the treasury department.

Note

1. For a more detailed analysis of the accounting translation process, we refer to Arpan and Radenbaugh (1985), and Eun and Resnick (1998).

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