The Group of 31 Report:

Core Principles for

Managing Multinational FX Risk

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Table of Contents

Preface

In 1998, General Motors Corporation sponsored a foreign exchange risk management benchmarking study conducted by Greenwich Treasury Advisors LLC. The purpose of the study was to develop an authoritative list of FX risk principles appropriate for multinationals for which FX risk management is neither a core activity nor a profit-making one.

With GM, we formed a group of 31 ("G31") world-class multinationals: 16 American, 13 European and two Japanese companies with average sales of $50 billion. Together with two American companies who requested anonymity, these companies participated:

Amoco	Du Pont	Hewlett-Packard	Nestlé	Siemens
BMW	Elf Aquitaine	IBM	Novartis	Texaco
BP	ENI	Lucent	Philips	Toyota
Chrysler	Fiat	Merck	Proctor & Gamble	Unilever
Daimler-Benz	Ford	Mobil	Sara Lee	Volvo
Dow Chemical	General Motors	NEC	Shell	

All companies made a financial commitment to the study, answered a comprehensive questionnaire on their FX risk management practices, and sent nearly 100 staff to four conferences in London, Munich and New York to review the results and help write this report.

In summary, we found that a majority — often a large majority — of the Group of 31 were following twelve core FX risk management principles. As we explain more fully in the main text, we validated these principles in a second study in 1999 with 33 American multinationals with average sales of $11 billion. In addition, we found that separating these principles into three categories — fundamental, trading-volume related, and risk-appetite related, provides useful implementation guidance.

It is the Group's wish that other companies will use the collective experience and judgment expressed in this Report to better protect shareholders, employees and other stakeholders from financial risk. Many of the principles and practices are equally applicable for managing interest rate and commodity risk.

With the publication of this report, we believe the burden of proof now shifts from having to justify implementing a principle to having to justify not doing it. With the discipline and security provided by adopting these principles, companies of any size can confidently use more sophisticated techniques to better protect their foreign exchange risks at a lower cost.

Acknowledgements

First, I would like to thank the General Motors Corporation for sponsoring the study and for their active support and encouragement, including J. Michael Losh, Executive Vice President & Chief Financial Officer, Eric Feldstein, Vice President & Treasurer, Mark Greenquist, formerly Assistant Treasurer and now CFO-GM Europe, as well as Mark Gibbens, Teresa Hilado and Robin Rocchi, all Treasury Directors of Domestic Finance, and Elizabeth Dolce, Manager, Foreign Exchange & Commodities. Second, I would like to thank Siemens for sponsoring the Munich meeting and the groupof31.com website, including Christian Weller von Ahlefeld, Head of Treasury and Michael Brauer, Head of Treasury Support and Control.

This report is the work of many individuals over an extended period of time. In alphabetical order, I especially want to thank the following people who also actively participated in developing this report:

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Magnus Lamne, Treasurer, Volvo Car Corporation
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Last, but definitely not least, this report is the culmination of seven years of GTA consulting and of four earlier benchmarking studies. My partner, Hugh Brocklesby, has played an integral role in these efforts and has been a steady source of support, hard work and sound judgment.

Finally, I would like to acknowledge my father, William B. Wallace, formerly Chairman of the Board and Chief Executive Officer, The Home Life Insurance Company, and Vice Chairman and Chief Operating Officer, The Phoenix Home Life Insurance Company. His character, industry leadership and philanthropy have been a life-long model and inspiration for me.

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Core Principles for Managing Multinational FX Risk

Corporate Foreign Exchange Risk Management

Briefly stated, corporate FX risk management is managing FX risk to an acceptable level at an acceptable all-in cost. For some, FX risk tolerance is so low that nearly any cost is acceptable. Others accept substantial risk to reduce hedge costs. There is simply no one right way to manage FX risk given each company's unique portfolio of operating, FX and other financial risks, GAAP considerations, business objectives, corporate culture and risk appetite. Balancing these risks, objectives and constraints is an art.

However, there is a science in developing a *process* to manage FX risk. In our study, we found 12 risk management principles being used by a majority — often a very large majority — of the Group of 31 to manage their foreign exchange risks. These principles mutually reinforce each other to promote:

- Measurable FX hedging objectives
- Accurate and timely information on performance versus objectives
- Minimization of transaction costs
- Rigorous error and compliance checking
- Senior management oversight.

Finally, it is important to note how these companies have made FX risk management more than just a Treasury responsibility. While Treasury does play the major role, these companies have made their FX risk management an *integrated, corporate-wide effort* involving senior management, operating units, accounting, budgeting/planning, internal audit and tax.

The Twelve Core Principles

1. **Document FX Policy.** Document an FX policy approved by senior management or the Board of Directors. Critical policy elements include: hedging objectives, hedgeable exposures, hedging time horizon, authorized FX derivatives, the extent to which positions can be managed upon views of future FX rates, compensation for FX trader performance, and hedging performance measures.

2. **Hire Well-Qualified, Experienced Personnel.** Have a sufficient number of qualified, experienced personnel to properly execute the company's FX policy.

3. **Centralize FX Trading and Risk Management.** Centralize the FX trading and risk management with Parent Treasury, which may be assisted by foreign hedging centers *reporting* to Parent Treasury.

4. **Adopt Uniform FX Accounting Procedures.** Require uniform foreign exchange accounting procedures, uniform exchange rates for book purposes, and multi-currency general ledgers for all FX transactions. Monthly, reconcile Parent Treasury's FX hedging results to the group's consolidated GAAP FX results.

5. **Manage FX Forecast Error.** If anticipated FX exposures are being hedged, manage the forecast error and take steps to minimize it to the greatest extent possible.

6. **Measure Hedging Performance.** Use several performance measures to fully evaluate historic hedging effectiveness. Evaluate current hedging performance by frequently marking-to-market both the outstanding hedges *and* the underlying exposures.

7. **Segregate the Back Office Function.** Segregate back office operations such as confirmations and settlements from trading. If trading volume is sufficient, use nostro accounts and net settle.

8. **Manage Counterparty Risk.** Have credit rating standards and evaluate counterparty risk at least quarterly. Measure credit exposure using market valuations, not notional amounts, against assigned

counterparty credit limits. Use ISDA or other kinds of master agreements with at least major counterparties.

9. **Buy Derivatives Competitively.** Execute the FX policy by competitively buying FX derivatives with appropriate trading controls.

10. **Use Pricing Model and Systems.** Have in-house pricing models for all derivatives used. Use automated systems to track, manage and value the derivatives traded and the underlying business exposures being hedged.

11. **Measure FX Risk.** Understand the full nature of the FX risks being managed with a combination of risk measures such as value-at-risk, sensitivity analysis and stress testing.

12. **Oversee Treasury's Risk Management.** Independently oversee Treasury's risk management with a Risk Committee to review and approve Treasury's risk-taking activities and strategies, exposure and counterparty credit limits, and exceptions to corporate FX policy. Depending upon the level of FX risks being managed, have either a part-time or a dedicated function to review Treasury's compliance with approved risk management policies and procedures.

Implementation Guidance

As businesses, multinationals that do not have FX risks on the same scale at the G31 must balance the costs of fully implementing these Principles — additional controls, staff, analysis and systems— against the intangible downside risks of not doing so. These are difficult decisions because the downside risks are generally only quantifiable after they happen.

In 1999, we did a second FX benchmarking study with 33 American companies with average sales of $11 billion that was based upon the G31 study. This second study validated the G31 principles, as a majority of this second group also followed each of the 12 principles. With a larger group size (the "G64"), we found that could usefully divide the 12 principles into three categories: fundamental (Principles 1-7), trading volume-related (Principles 7-9) and risk appetite-related (Principles 10-12). Fundamental principles are applicable to any company managing FX risk, regardless of trading volume or risk appetite. The volume-related and risk-related principles become increasingly important as the level of FX trading volume and the willingness to accept FX risk, respectively, increases.

Of course, any division is somewhat arbitrary because all of the principles are core and reinforcing, with substantial overlap between categories. And, as trading volume or risk appetite increases, the need to strengthen the implementation of all 12 principles increases as well.

Table 1 shows how FX trading volume — the number of FX trades done per month — influences the application of the principles on back office, counterparty risk, and trading:

Table 1: Risk Management Practices/(G64 Base)	**FX Trades/Month**		
	<40 (18)	**40-150 (25)**	**>150 (21)**
Automated system for trade tickets	17%	36%	57%
Electronic confirmation matching service	28%	36%	52%
Nostro accounts for main currencies	11%	44%	60%
Net settle multiple trades	39%	64%	57%
ISDA/IFEMA master agreements	50%	64%	81%
Use market values for counterparty risk	39%	52%	62%
Credit limits for major counterparties	44%	64%	95%
Have a dealing room	6%	40%	90%
Tape trade transactions	0%	20%	52%

Table 1: Risk Management Practices/(G64 Base)	FX Trades/Month <40 (18)	40-150 (25)	>150 (21)
Record all bids for each trade	22%	72%	43%
Typically ask for two-way spot quotes	11%	44%	67%
Competitively bid interco netting settlements	0%	40%	43%

As a definition of risk appetite, we found we could divide the companies into risk averse, mainstream and dynamic hedgers based upon three key hedging practices in Table 2 below:

Table 2: Hedging Practice/% of G64	Risk Averse 34%	Main-stream 49%	Dynamic Hedgers 17%
Passive or active hedging style	Passive	Either	Active
Average FX option trades/month	0.5	6.1	44.5
Range of FX option trades/month	0 - 5	0 - 35	5 - 150
Compensating traders for performance	No	Limited	Yes

Table 3 shows a general pattern of progressively more sophisticated risk management practices related to using systems and pricing models, measuring FX risk, and the level of management oversight as we move from the risk averse hedgers to dynamic hedgers:

Table 3: Risk Management Practices/(G64 Base)	Risk Averse (22)	Main-stream (31)	Dynamic Hedgers (11)
FX policy specifies permitted derivatives	77%	78%	91%
% using options with pricing models	60%	75%	89%
Third party FX risk management system	55%	55%	64%
Active value-at-risk user	27%	44%	55%
Numeric or scenario stress testing	45%	52%	73%
FX/Financial Risk Committee	59%	65%	73%
Independent FX compliance function	5%	13%	82%

Thus, companies can use the above information to help categorize themselves by trading volume and risk appetite, and then use that category as a rough yardstick of how important the practices that make up Principles 7-12 should be to them. However, we strongly suggest that the companies with low trading volumes or who are risk averse not to be complacent about their implementation of any of these principles. For example, as we will see at Principle 5 below, G31 risk averse hedgers do not manage forecast error very well and are effectively taking more FX risk in that area than mainstream or dynamic hedgers. Please note that Tables 1-3 are the only tables providing the results of 64 companies; all of the subsequent tables and charts refer solely to G31 practices.

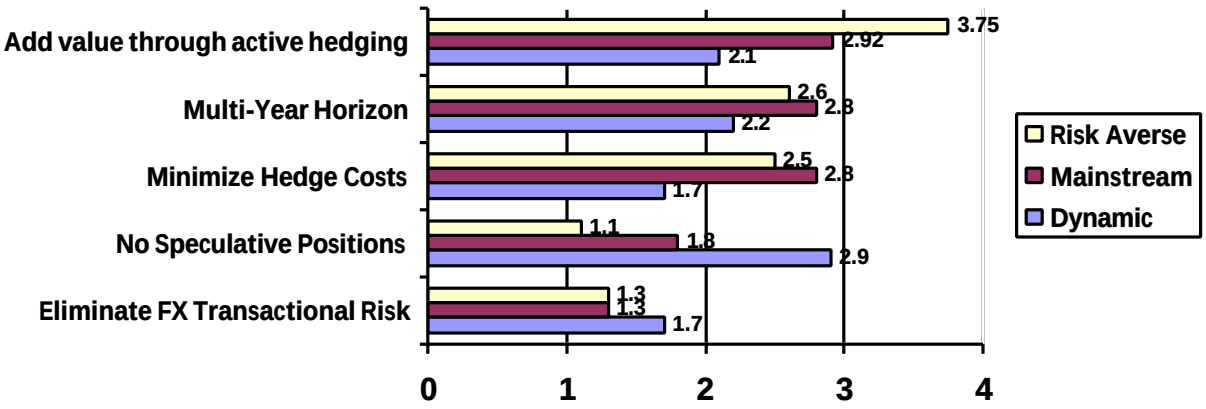
1. Document FX Policy

Document an FX policy approved by senior management or the Board of Directors. Critical policy elements include: hedging objectives, hedgeable exposures, hedging time horizon, authorized FX derivatives, the extent to which positions can be managed upon views of future FX rates, compensation for FX trader performance, and hedging performance measures.

Although Treasury should be actively involved, it is a senior management responsibility to define how the foreign exchange risks of the corporation should be managed. 97% of the G31 had written policies, with the following elements in 50% or more of these written policies:

- **Hedging objectives**. Common objectives cited by the G31 include eliminating foreign exchange risk, minimizing hedge costs within defined risk parameters, hedging to obtain competitive advantage and minimizing FX volatility over a multi-year time horizon. Chart 1 shows the importance of various objectives on a 1-5 scale, with 1 = very important and 5 = not important.

Chart 1: How Importance of Hedging Objectives Vary



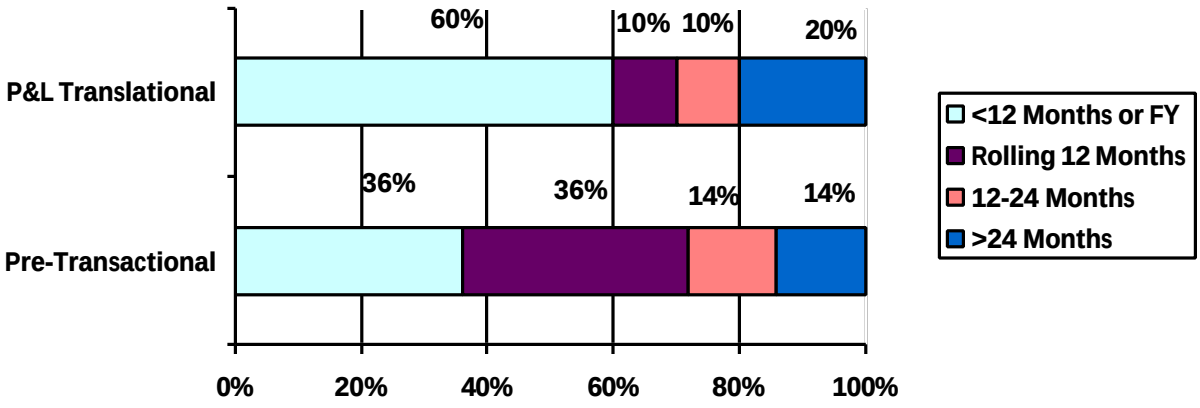
- **Trading and hedging responsibility**. All companies had centralized trading operations to a significant extent and nearly all had centralized the hedging decision. See Principle 3 on centralization below.
- **Exposures to be hedged.** The exposures that are candidates for hedging include: third party booked transactional exposures; intercompany booked transactional exposures; third party or intercompany debt; contractual future foreign currency commitments (e.g., multi-year contracted capital expenditure payments in foreign currency); anticipated but not yet booked future foreign currency revenues and expenses; foreign unit earnings (i.e., P&L translational exposures); foreign unit booked and anticipated dividends; and foreign unit balance sheet equity.

  Not all of these exposures were hedged by the G31. Table 4 shows G31 general hedging practices for these kinds of exposures. The percentages do not necessarily mean that x% of the G31 will always hedge in all circumstances or that when they are hedged, the exposures are 100% hedged:

Table 4: **FX Exposure Category**	**G31**
Third party booked transactional exposures	100%
Intercompany booked trade exposures	84%
Booked intercompany dividends	83%
Foreign currency external/intercompany debt in OECD countries	70%
Anticipated transactional exposures	68%

- **Time horizon.** For anticipated exposures, whether transactional or P&L translational, the hedging time horizon should be specified. Companies that tend to hedge longer time horizons are generally exporters, who have a strong need to manage their profit margins, or those with stable businesses with reliable exposure forecasts. Chart 2 shows the G31's broad range of hedging time horizons, from less than one year to greater than two years:

Chart 2: How Hedging Time Horizons Vary



- **Permissible derivatives**. The general kinds of FX derivatives used by the G31 are shown in Table 5 below. Corporate FX traders will want to compare the G31's average size to bid out specific derivatives with their own minimums. Treasurers will want to compare the average maturity of their own derivatives — as a measure of willingness to take risk and pay premiums — with the G31:

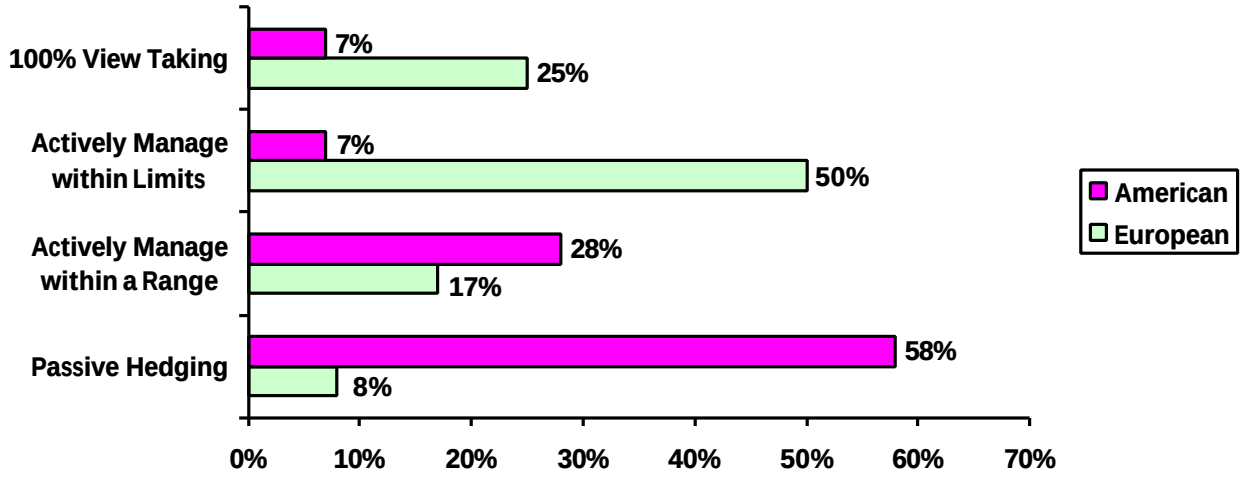
Table 5: FX instrument	Mean Minimum Size to Bid ($000)	Mean Maturity (Months)	G31
Spot/forward contracts	2,800	N/A	100%
Purchased European options	4,900	7	86%
Non-deliverable forwards	3,100	5	48%
Range forwards (collars)	5,600	7	45%
Written covered options	10,200	6	41%
Purchased barrier options	7,500	N/A	34%
Written naked options	6,500	3	21%
Purchased average rate options	3,600	10	14%
Exchange-traded options	N/A	6	10%
Exchange-traded futures	N/A	4	7%
Purchased basket options	2,000	18	3%

- **Option Use.** A key separator within the Group is actively using purchased FX options. The heavy option users viewed reducing hedge costs as a much more important hedging objective than the infrequent option users, who conversely placed a much higher emphasis on eliminating FX risk. Table 6 shows how the G31 falls into three distinct groups in their use of FX options.

Table 6: Option Use	Annual Option Trades	Mean Trades	G31
Limited	0 - 20	7	32%
Medium	21 - 200	115	39%
High	201 - 1800	690	29%

- **Active trading techniques.** The G31 companies varied considerably in using these such techniques as replacing existing hedges (e.g., options) with new hedges (e.g., forwards); closing out existing hedges prior to maturity, leaving positions open; keeping successful hedges on even if the original forecast underlying exposure disappears; increasing a net position with a derivative; and reversing a net position with a derivative (e.g., making a net long position short). The latter three practices are aggressive and over 80% of the G31 do not allow them.
- **View-taking.** Most G31 companies had a consistent view-taking approach for each of the kinds of exposure they hedged. Chart 3 below uses these definitions: passive hedging as formulaic hedging without any discretion to make hedging decisions on the basis of rate views; and active hedging does include the ability to take net hedge positions on the basis of rate views, which may include a mixed active/passive strategy. Chart 3 also confirms widespread anecdotal evidence that Europeans hedge more actively than Americans:

Chart 3: Hedging Approaches



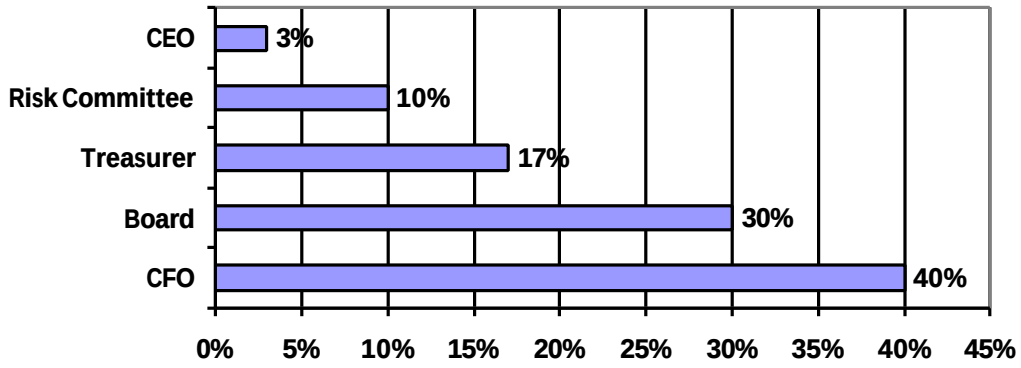
- **Performance evaluation measures.** See Principle 6 on measuring hedging performance below.

- **Performance compensation.** Nearly half of the Group did not reward traders for results, while 30% had a positive correlation between performance and rewards, and 20% had a strong positive correla-

tion between performance and bonuses. Not surprisingly, performance compensation was concentrated with the dynamic hedgers.

- **Internal controls.** Segregation of duties is the most important requirement. However, ensuring this occurs is not always a treasury responsibility.
- **Compliance.** Responsibility for ensuring compliance with applicable tax laws, exchange control regulations, and GAAP accounting and management accounting practices should be specified.
- **Risk oversight.** See Principle 12 below.
- **Policy approval level.** Chart 4 shows how FX Risk management policies are generally approved at the Chief Financial Officer level or higher.

Chart 4: FX Policy Approval Levels



Other policy elements that were included by a large minority of the G31 include responsibility for preparing reports on FX risk management activities, a listing of prohibited derivative instruments, requirements for using value-at-risk or stress testing procedures, and assigning responsibility for reviewing treasury's compliance with approved risk management policies and procedures.

We recommend that companies consider splitting their FX risk management policies into two parts. The first part is a brief summary of general principles and procedures, including performance evaluation, which is approved by the Board of Directors or a Board committee. The second part is a detailed operating agreement between the CFO and the Treasurer on how the company will manage its FX risks.

While the majority of the G31 will change their policies when situations warrant, we suggest that best practice is to formally review the policy every 2-3 years to see whether it is still applicable to current conditions. See the Conclusions section after Principle 12.

2. Hire Well-Qualified, Experienced Personnel

Have a sufficient number of qualified, experienced personnel to properly execute the company's FX policy.

As these standards make clear, prudent corporate multinational hedging requires a significant investment in policy and procedures, systems, support from other company units and departments, and, most important of all, qualified people to manage the process. There must be enough treasury personnel to ensure an adequate segregation of duties, as discussed further at Principle 7.

Regarding qualifications, on average, the international treasury staffs had 7.7 years of corporate treasury and financial institution experience and were 35 years old. Slightly more than half (75% for American MNC's) of the G31's HQ international treasuries had post-graduate degrees, while only 4% had only high school educations.

Regarding hiring practices, nearly a quarter would hire outside corporate treasury staff and bankers and expect them to remain in treasury, while nearly half would have a combination of outside hires and internal rotation. The remaining quarter had a strong policy of internal rotation. Regarding training, 80% of the G31 would send new corporate traders to an outside FX trading course, something that some of the major banks occasionally run. 70% have written job descriptions of all treasury positions. On average, the international treasury staffs have five days of annual continuing education.

3. Centralize Trading and Risk Management

Centralize the FX trading and risk management with Parent Treasury, which may be assisted by foreign hedging centers ***reporting*** *to the Parent Treasurer.*

The Group as a whole is strongly in favor of centralizing FX risk management — the decisions on what exposures to hedge and how to hedge them — with 86% managing FX risk at Parent Treasury and/or among regional hedging *centers reporting directly to the Treasurer*. Centralizing risk management allows for economies of scale in sophisticated trading systems and analytics, better internal controls, etc. In addition, by centralizing, companies can feel more comfortable in using more sophisticated options because the risks are controlled in only one or two locations, rather than being defused to the foreign operating units. For example, the few G31 companies who had decentralized risk management were not option users.

Centralizing the FX trading has obvious advantages: a reduced number of employees with trading authority, more professional trading, more efficient back office operations and enhanced netting opportunities. Even companies that did not have centralized FX risk management would undertake these kinds of activities to net or otherwise reduce individual FX trading among the operating units with:

- Parent Treasury or regional hedging centers entering into FX trades on behalf of local units.
- Effective and efficient settlement mechanisms for intercompany transactions.
- Centralized third party foreign currency receipts and disbursements.
- Currency of billing and supplier invoicing policies

4. Adopt Uniform FX Accounting Procedures

Require uniform foreign exchange accounting procedures, uniform exchange rates for book purposes, and multi-currency general ledgers for all foreign exchange transactions. Monthly, reconcile Parent Treasury's FX hedging results to the group's consolidated GAAP FX results.

Good *worldwide* accounting systems and procedures are critical because the accounting provides an independent check over Treasury's hedging activities. 87% of the Group have one standard set of foreign exchange accounting instructions that nearly every group unit follows, and 67% have one common group of accounts for all units (even though they may have different general ledger systems). Similarly, 87% of the G31 require their operating units to use the same comprehensive list of P&L and balance sheet FX rates to book their foreign currency transactions.

Slightly over half of the G31 prepare internal consolidated statements on a monthly basis, with 40% on a quarterly basis and 10% on a semi-annual basis. Monthly reporting is recommended because waiting quarterly or semi-annually to discover hedging or forecast errors allows too much time to elapse. Reversing or adjusting the hedge can then become costly. Reconciling Treasury's FX results with the GAAP P&L FX gain or loss, which 81% of the G31 do, can reveal these kinds of errors. Another important accounting check on Treasury's use of derivatives is having accountants who really understand derivatives and derivative accounting. In 50% of the G31, accounting was fully responsible for derivative accounting, while for 40% it was a shared accounting/treasury responsibility.

In addition, 86% of G31 companies that had foreign operating units with substantial foreign exchange transactional exposures have multi-currency subledgers to account for the resulting FX gains and losses.

Few G31 companies compromise the integrity of their financial and FX exposure reporting by having an off-line spreadsheet system or converting the foreign currency transactions into local currency transactions in their ledgers and making FX adjustments later.

5. Manage Forecast Error

If anticipated FX exposures are being hedged, manage the forecast error and take steps to minimize it to the greatest extent possible.

70% of the G31 hedge forecast exposures. For those that do hedge forecasts, forecast errors are the most likely source of FX losses. The best traders, systems and controls can't prevent a loss on a derivative that is hedging an exposure that no longer exists. This is particularly true when hedging with forwards, range forwards (aka collars) and written options.

While Treasury is generally not responsible for forecasts, Treasury should definitely ensure that there is focus on analyzing forecast error and recommending steps to reduce it:

Table 7: Forecast Error Mechanisms	**Risk Averse (8)**	**Main-stream (12)**	**Dynamic Hedgers (11)**
Hedge costs and FX losses allocated back to units	13%	42%	18%
Units must explain material variances	13%	17%	27%
Senior management reviews forecast variance	13%	17%	36%
Account forecasting is part of unit evaluation	0%	8%	9%
Essentially none	75%	25%	27%

The problem of forecast error becomes acute when local units are not charged for FX gains and losses, so the local units have no incentive to spend much time on doing accurate forecasts. Also, it is interesting to see that 75% of the Risk Averse hedgers — who often have passive hedging rules of hedging 100% — do nothing to improve or manage forecast error. Please see the additional comments on evaluating forecast error in the Conclusions section. A final comment is that forecast error is a major determinant of the appropriate hedging time horizon, since there is no point in hedging unreliable forecasts.

For companies following US GAAP, the adoption of FAS 133 will place increasing emphasis on accurate forecasts. FX hedge gains and losses due to forecast errors will not be deferred and will be separately disclosed in earnings. Under FAS 133, which will become effective for fiscal years beginning after June 15, 2000, a pattern of substantial forecast error may disqualify a company from receiving hedge (deferral) accounting.

6. Measure Hedging Performance

*Use several performance measures to fully evaluate historic hedging effectiveness. Evaluate current hedging performance by frequently marking-to-market both the outstanding hedges **and** the underlying exposures.*

Regarding performance measures, 97% of the Group measure the effectiveness of their hedging, but Table 8 shows there is no clear consensus on which benchmarks are preferred:

Table 8: Performance Benchmark	**G31**
Effective hedge rate against booking rate	53%
Forecast variance analysis	50%
100% hedging benchmark	43%
Last year's results	37%
Model portfolio	33%

Table 8: Performance Benchmark	**G31**
Effective hedge rate against plan rate	30%
0% hedging benchmark	20%
VaR risk-adjusted basis	20%
50% hedging benchmark	7%

Performance benchmarks need to be chosen carefully, because they often can drive hedging results to cluster around them. Of course, any performance hedging analysis should exclude the impact of FX gains and losses related to forecast errors.

Approximately a third of the Group marks-to-market their outstanding derivative exposures daily, while an additional 25% do it weekly and an additional 30% monthly. In other words, 7 out of 8 companies mark-to-market their derivatives at least monthly and more than a majority mark at least weekly.

In our view, the question arises whether marking-to-market only the derivatives hedging actual or forecast exposures, ignoring the exposures, is sufficient *for risk management purposes*. For example, if a forecast one year exposure is considered real enough to hedge, shouldn't it also be marked-to-market? If only derivative hedges are marked, how can this be a true economic measure of the risks that the multinational treasurer is managing? From a performance measurement standpoint, how can one do an interim evaluation of the hedging effectiveness without marking-to-market both the hedges and the underlying positions, particularly for Mainstream or Dynamic Hedgers**.** who have discretion to partially hedge — or not hedge at all — the forecast exposures and often will use options rather than forwards?

However, of those 70% of companies hedging anticipated transactional exposures only 33% would regularly mark-to-market their anticipated future transactional or P&L translational exposures net of the derivatives hedging those exposures. For companies following US GAAP, FAS 133 requires a quarterly "hedging effectiveness" test. Both the hedge and the hedged item are to be marked-to-market, with any "ineffectiveness" recorded in current earnings.

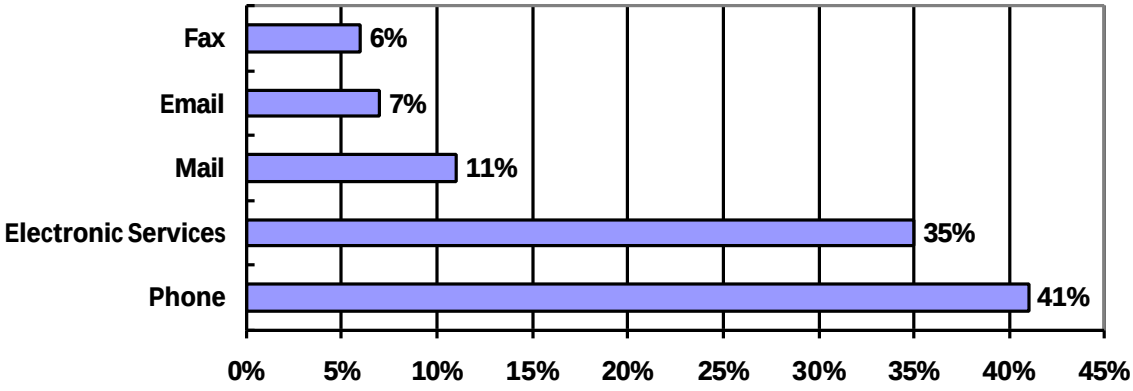
7. Segregate the Back Office Function

Segregate back office operations such as confirmations and settlements from trading. If trading volume is sufficiently large, use nostro accounts and net settle.

Many of the worst derivative debacles of the last decade can be traced to a simple failure to properly segregate duties, in which the FX traders involved were also doing such Back Office activities as confirmations, accounting or settlements. Not surprisingly, only a very few (7%) companies in this Group allowed their FX traders to do any of these activities.

It is most important that non-traders are responsible for confirming trades. Regarding the form of these confirmations, Chart 5 shows that phone confirmations and matching services are the most widely used:

Chart 5: Confirmation Practices



Factors to consider in using electronic matching services are the ease of use by both the corporate and its trading partners in exporting trade details from their existing systems to the matching services' format. In addition, if standard settlement instructions are not used, having to confirm settlement instructions separately via other media means that little additional effort is saved.

A final control point in the confirmation process is prohibiting "historic rate rollover" trades in the trading mandate letters to the trading counterparties. Only 16% of the G31 allow these kinds of trades in which a loss or gain on a maturing derivative is "rolled over" into the rate of the succeeding contract, avoiding an interim cash payment or receipt. Sometimes this practice may provide deferral accounting for non-US GAAP or foreign tax purposes. However, there is a substantial risk that losses can be hidden for a considerable period of time if historic rate rollover trades are allowed ***and*** traders confirm their own trades ***or*** if derivative trades are not frequently marked-to-market.

Traders should not be involved in the settlement function because this lessens the controls on fraud. Rather than have the trader direct the counterparty bank where to send the funds, slightly more than half of the G31 use standard settlement instructions directing their trading banks to automatically deliver all purchased funds to individual currency cash concentration accounts ("nostro accounts"). Then, the back office/cash management function provides the wire transfer instructions with the same degree of internal control as any wire payment.

With nostro accounts, it is easier to monitor and manage failed deliveries, avoiding a chain reaction where the company fails on its delivery of funds to a third party due to the original fail. For this reason, many nostro accounts will have backup credit lines. However, these additional control measures will incur additional account maintenance and wire transfer costs, which is why half the G31 do not have these controls.

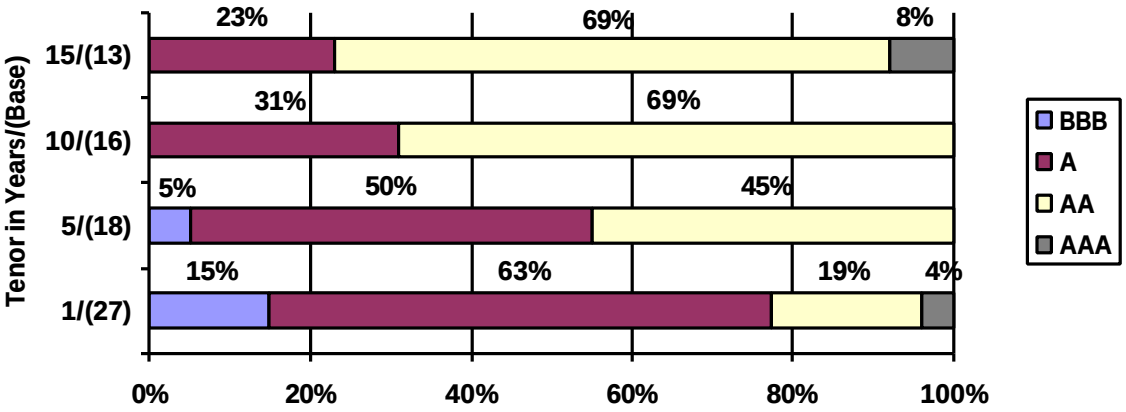
Slightly over half of the G31 regularly net their settlement payments to their major banks whenever there are offsetting flows. For example, if a company owed a bank DEM 10 million on one trade, and was receiving DEM 7 million from the same bank on same day for another trade, net settling means to pay the bank only one transfer of DEM 3 million. This reduces transaction costs as well as the settlement risk that a company could pay out the DEM 10 million and, due to a bank failure, not receive the DEM 7 million due to them. Net settling also minimizes "daylight" overdraft problems as well.

8. Manage Counterparty Risk

Have credit rating standards and evaluate counterparty risk at least quarterly. Measure credit exposure using market valuations, not notional amounts, against assigned counterparty credit limits. Use ISDA or other kinds of master agreements with at least major counterparties.

93% of the G31 relies upon public ratings (Moody's, S&P, Fitch IBCA, etc.) rather than in-house analyses for counterparty credit evaluations. Less than 40% of the G31 would deal with special purpose vehicles ("AAA swapcos") if the parent holding company had a less than acceptable credit rating. As shown in Chart 6 below, few companies deal with banks rated below A. Banks rated AA were required by 50% or more of the G31 as counterparties for derivatives with tenors of 5 years or more:

Chart 6: How Minimum Counterparty Credit Ratings Vary by Derivative Tenor



In calculating credit exposure, 70% use the market value of the derivative rather than its notional amount. 75% of the group calculate their credit exposures to their financial counterparties on at least a monthly basis. Non-FX items that are included in a majority of the credit exposure calculations are: investments, interest rate swaps and other interest rate derivatives, and operating account balances. Other items included in some calculations are commodity derivatives and pension asset risks.

In addition, 59% of the G31 calculate their credit exposure on a worldwide basis, including all foreign operating units. Another 14% will calculate non-Parent counterparty credit exposure separately. However, 58% of the G31 will *exclude* joint venture counterparty credit exposure. In our opinion, we believe that many companies have a potential weakness with their joint venture treasuries, who trade on their parents' names but rarely have their parents' depth of treasury controls.

However calculated, credit exposures are then compared against assigned credit limits by 93% of the Group. The most frequent review is annually (41%), with the remainder monthly (36%) or on an ad hoc basis (23%).

On a related issue, 60% of the Group use ISDA master agreements, various local master agreements, or their own master agreement to govern their trading relationship with their major trading bank counterparty. Master agreements allow for the netting of the gains and losses on the whole portfolio of transactions that a company may have with a bank, in the event of a bankruptcy by either party. Otherwise, the bankruptcy trustee could claim the right to "cherry pick" the trades, requiring payment for the trades in which the bankrupt party is in the money, but defaulting on the trades in which the bankrupt party is owing money.

Master agreements are legally complicated documents that can be costly and time-consuming to execute. Typically, the G31 companies will develop a modified version of the ISDA master agreement and impose the same agreement on their major trading banks as a condition for trading with them. Common modifications to the ISDA agreement by the G31 include: defining minimum thresholds to avoid techni-

cal default due to immaterial amounts or errors (55%), cross-default clauses limited to parent country entities only (55%), dealer cross-default clauses (50%), dealer required to submit detailed financials (45%) and defined interest penalty rate for failed payments (45%). Only 36% of the G31 state in their master agreements that they do their own analysis and do not rely on the bank's recommendation in entering any derivative transaction.

9. Buy Derivatives Competitively

Execute FX policy by competitively buying FX derivatives with appropriate trading controls.

81% of the G31 have FX dealing rooms to conduct their trading. With two or three traders in the same room, it is easier to do competitive bidding and financial rate terminals can be easily shared, minimizing operating costs. 55% record all winning and losing bids for each trade and of this 55%, 70% (or 39% of the Group) will have a rotating bank group, periodically dropping the least competitive bank. When doing competitive bidding on spots, forwards and FX swaps (not currency swaps), companies on average ask 2.3 banks to bid. For European options, the average increases slightly to 2.7.

However, not all G31 companies competitively bid out their FX in this manner. Instead, 65% use the interbank practice of asking one bank to give a two-way quote. This is an effective competitive bidding technique if the company's FX deals are likely to go either way and historic bid/offers are tracked by bank. This trading technique, which is more common among European multinationals than U.S. or Japanese companies, allows quicker trading, since the time and effort of getting one or two more banks to bid is eliminated. In addition, one two-way quote minimizes the risk of "moving the market" that can sometimes happen when competitively bidding a very large trade.

An emerging issue is electronic trading. While none of the Group companies do any Internet FX trading, in our opinion this is only a matter of time. Approximately a third of the G31 uses a bank's electronic quoting system for small trades.

10. Use Pricing Models and Systems

Have in-house pricing models for all derivatives used. Use automated systems to track, manage and value the derivatives traded and the underlying business exposures being hedged.

Overall, 70% of the Group have in-house pricing models for all of the derivatives they use. Only 30% said they bought FX options, such as barrier or average rate (Asian) options, that they cannot model in-house.

A key issue is calibrating these pricing models to ensure that they are accurate, which only 42% of Group independently review. This will become increasingly important due to FAS 133's requirements of marking-to-market all derivatives, included funding-related currency swaps and embedded derivatives. Table 9 below shows the G31 reported a surprisingly wide variation in model pricing results for these common FX derivatives:

Table 9: Derivative	**High-Low Range/ Mean Price**	**Standard Deviation**
USD/JPY 3 year floating/fixed currency swap	28.0%	7.9%
USD/CHF 7 year fixed/fixed currency swap	16.7%	5.3%
DEM/USD 3 month European option	4.1%	1.0%

The Group also firmly believes in investing in systems to help them measure and manage their FX risks, with 67% using third party FX analytical systems, 16% using an in-house system, and only 16% using no analytical systems at all. Nearly half have integrated risk management systems that help manage the trading, tracking, risk management, accounting and settlement of their FX derivatives in one system. This "straight through processing" minimizes scarce staff time, errors and other problems by entering the FX

derivative trade only once. As we see in Table 10 below, the companies that did not have these integrated systems generally have multiple systems and enter and re-enter the same derivative trade 2-5 times.

Table 10: Derivative	Respon-dent Base	% Once	# of Times the Others Re-enter Same Trade
Spots/Forwards	(27)	70%	4.8x
Options	(21)	76%	4.6x
Currency swaps	(25)	64%	2.4x

11. Measure FX Risk

Understand the full nature of the FX risks being managed with a combination of risk measures such as value-at-risk, sensitivity analysis and stress testing.

In 1998, slightly more than half of the Group were using value-at-risk ("VaR"), with an additional 30% (i.e., 80% in all) expecting to use VaR by 1999. The most common uses of VaR for existing users are: to manage portfolio exposures to specific VaR limits (63%), as a general risk measure (50%), to evaluate future earnings at risk (44%), and to evaluate future cash flows at risk (31%). Typically, companies use a 95% confidence level and a one-day time horizon. Two-thirds of the VaR users use variance/co-variance methodologies (e.g., Morgan's RiskMetrics™), with the remainder using historic rate and Monte Carlo simulations. Half of the users receive their volatility and correlations estimates from JP Morgan's RiskMetrics™, 33% use their own estimates, 20% rely on their banks, and 7% use Bloomberg.

More than half of these companies backtest their VaR occasionally, and 25% do so regularly. In backtesting, users compare VaR predictions of the likely loss with actual losses to evaluate their model's predictive accuracy. For example, when using a 95% confidence level, are actual losses exceeding the VaR estimate only one day in 20? However, Table 11 below shows a substantial need to calibrate the VaR models, a need which was discussed earlier in Principle 10. No doubt some of the exceptionally wide variation in VaR estimates in Table 11 is due to different volatility/correlation estimates and different VaR methodologies:

Table 11: VaR Pricing Results	High-Low Range/ Mean Price	Standard Deviation
1-day VaR of a 6-currency portfolio	45.4%	16.6%
30-day VaR of a 6-currency portfolio	27.6%	14.0%

In GTA's view, a variance/co-variance VaR methodology is best used for essentially a booked transactional FX portfolio over a very short time horizon (1-7 days). Monte Carlo VaR is most useful for longer-term horizons, but requires a sophisticated statistical background to properly execute as well as to derive good long-term volatility and correlation estimates. In either case, the above wide variations in VaR estimates highlights the critical importance of using *several* FX risk measures rather than relying on just VaR alone.

In addition to VaR analysis, slightly more than half (55%) of the Group do some sort of stress testing of their exposures. The most popular tests are ±10% currency movements, non-parallel shifts in the forward curve, breakdowns in current currency correlations and scenario testing (e.g., the September 1992 EMS crisis). In addition, nearly two thirds (65%) of the Group do some sort of marginal sensitivity analysis of their FX risks. The most often performed analyses are: calculating the impact on the parent currency P&L of a marginal change (e.g., 1%) in the value of all non-parent currency FX rates and a marginal change in the USD/parent currency exchange rate if the company was a non-dollar parent currency company.

Not only are the actual numbers that these tests and measures produce valuable, but so is the change from prior tests. Investigating large swings can provide useful insight as to whether composition changes, market volatility or both have caused a given FX portfolio to become more or less risky.

If the stress testing produces unsatisfactory results, then the G31 take one or more of the following kinds of action: use the results as guidance in forming contingency plans (38%); actually change the portfolio composition to make it less vulnerable (38%); or more closely watch the portfolio (31%). Some may ignore the testing result entirely if the scenario likelihood is considered small (23%).

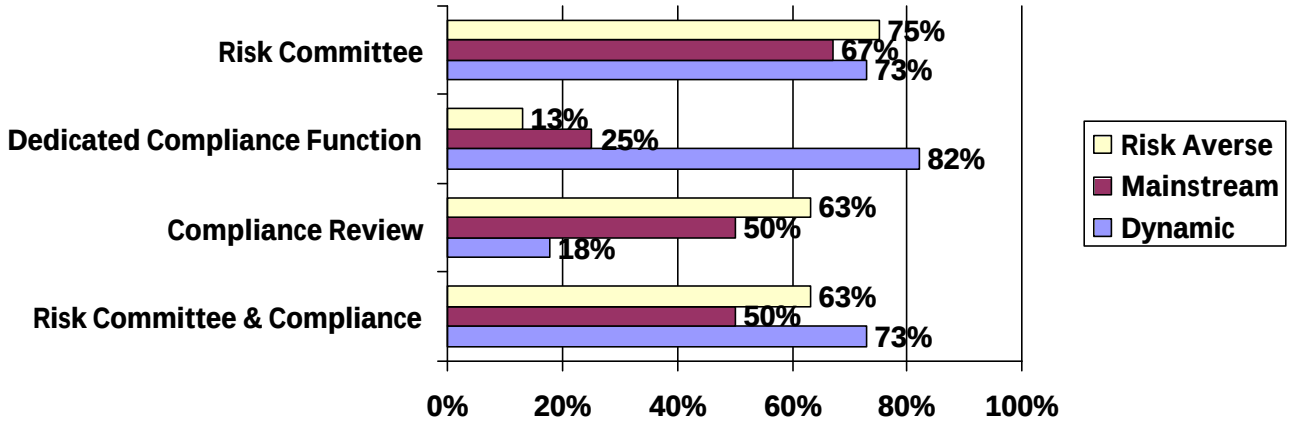
12. Oversee Treasury's Risk Management

Independently oversee Treasury's risk management with a Risk Committee to review and approve Treasury's risk-taking activities and strategies, exposure and counterparty credit limits, and exceptions to corporate FX policy. Depending upon the level of FX risks being managed, have either a part-time or a dedicated function to review Treasury's compliance with approved risk management policies and procedures.

90% of the companies oversee Treasury's risk management by having a Risk Committee (69%) or a compliance function (84%) or both (61%). A Risk Committee is generally headed by the CFO, and includes the Treasurer, an Assistant Treasurer, the Controller or Assistant Controller, and sometimes a senior HQ international operating manager. It provides an informed management review, similar to a bank's Asset/Liability Committee, over Treasury's risk activities. We found that the Group of 31 typically use their Risk Committees to approve FX hedging guidelines, new FX risk management techniques, exceptions to corporate FX policy, FX exposure limits and counterparty credit limits.

In addition, 84% of the G31 also specifically monitor compliance with policy: Treasury using only approved derivatives, following trading procedures, properly calculating net exposures, measuring FX risks correctly and using secure systems. Half of these companies had a dedicated compliance function, independent of Treasury, while half had a part-time function, staffed by other treasury personnel, internal audit, accounting, etc. with other duties. Chart 7 shows that companies with the most dynamic FX risk management operations are the most likely to have a dedicated compliance function:

Chart 7: How Oversight Practices Vary by Risk Class



Conclusions

All corporate policies, especially good ones that have been developed with much thought and effort, run the risk of being applied mechanically despite changing circumstances. External changes such as new international economic conditions, currencies, derivatives, accounting standards and tax regulations as well as internal changes due to increased operating growth, industry competition, major acquisitions and divestitures, etc. are all reasons why we believe companies should establish a formal review process to assess every two or three years whether current FX policies and procedures are still adequate and appropriate. The Risk Committee is an ideal vehicle for this review.

We suggest that this formal review process include addressing these perennial questions of corporate FX risk management:

- Is the company's current risk appetite appropriate to the current business? For example, are existing position, VaR or credit limits too restrictive given the current scope of business activity?
- Does active trading — over a multi-year time horizon — provide more value on a risk-adjusted basis than using simple passive hedging rules?
- Are the company's current hedging practices generating excessive hedge costs — or FX volatility — that is impacting the company's overall competitiveness?
- How accurate are the FX forecasts? If forecast error is persistently large, should hedging time horizons be reduced?
- Are the company's FX risks adequately measured?
- How can the company's business operations be re-engineered to reduce FX risks and increase competitiveness?
- How can there be better co-ordination between the operating units generating and reporting the exposures and Treasury hedging them?
- Are current hedge instruments adequate for the risks being managed? Should options be more actively used?
- Are risk management procedures adequate and consistent worldwide, not just at HQ?
- Are existing systems and reporting procedures adequate for the company's current level of FX risk and exposures?
- The most important question is the company's view of the nature of its FX risk in the context of its overall business: is it a financial risk to be hedged away? Or is it just one of the company's operating risks, managed on a cost/benefit basis for competitive advantage?

Request for Comments

This is our first edition and we would like to continue the practice of making this document a collective effort. Please send your comments and suggestions to Greenwich Treasury Advisors LLC, 127 W. Putnam Avenue, Greenwich, CT 06830, email: gta@gtaLlc.com, phone: (203) 531-0835 or fax: (203) 531-7018. We will acknowledge substantive contributors in our second edition.

Index

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