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Foreign Exchange Hedging Strategies at General Motors: Transactional and Translational Exposures

In September of 2001, Eric Feldstein, Treasurer and Vice President, Finance for General Motors Corporation (GM) paid little attention to his unobstructed view of Central Park from his office far above the Manhattan traffic. He was preoccupied with particular foreign currency exposures that required significant risk management decisions. An immediate priority was a decision on what to do about GM's billion dollar exposure to the Canadian dollar. Another pressing issue was GM's exposure to the Argentinean peso in light of the expected devaluation in the months ahead.[1]

Feldstein and his treasury team were responsible for all of GM's monetary transactions and for managing the myriad risks associated with the timing of those transactions. They handled everything from investing excess cash from vehicle sales receipts to hedging currency risks when a foreign subsidiary like Opel Austria announced it would remit a dividend to the worldwide parent company. The GM Treasury program invested heavily in its people, rotating them through functional positions and offices around the world, developing their skills and experience. The unit continued to produce individuals who went on to senior finance positions with GM subsidiaries or elsewhere within the GM organization or left for senior roles at other major U.S. companies.

As GM expanded around the world, the magnitude of its exposures to foreign currencies grew. Because exchange rate swings created gains and losses that flowed through GM's reported income statement, it was essential from a planning and management perspective to understand GM's foreign exchange flows and to manage the earnings and cash flow volatility they imposed on GM. Feldstein constantly followed news on volatile political situations around the world and kept abreast of macroeconomic trends that might affect GM's finances.

GM senior executives had implemented a number of formal policies with respect to foreign exchange risk management and hedging procedures. These policies guided the vast majority of treasury operations, but on occasion situations arose that required special attention and possibly a deviation from the stated policy. Feldstein, who had the authority to sign off on policy deviations,

[1] The economic consequences of movements in the Japanese yen were also of significant concern and are the subject of "Foreign Exchange Hedging Strategies at General Motors: Competitive Exposures," HBS Case No. 205-096 (Boston: Harvard Business School Publishing, 2005).

Professor Mihir A. Desai and Research Associate Mark F. Veblen prepared the original version of this case, "Foreign Exchange Hedging Strategies at General Motors," HBS Case No. 204-024. This version was prepared by Professor Mihir A. Desai.and Research Associate Mark F. Veblen. HBS cases are developed solely as the basis for class discussion. Certain figures and details have been disguised and do not reflect the actual operations of General Motors Corp. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

was currently reviewing such proposals for the Canadian dollar (CAD) and Argentinean peso (ARS). In his analysis, Feldstein paid particular attention to the transactional and translational consequences of the CAD exposure, the choice of instruments he could use to implement any deviations and possible responses to the worsening situation in Argentina.

Overview of General Motors and its Treasury Operations

General Motors[2]

General Motors was the world's largest automaker, with unit sales of 8.5 million vehicles in 2001—15.1% worldwide market share—and had been the world's sales leader since 1931. Founded in 1908, GM had manufacturing operations in more than 30 countries, and its vehicles were sold in approximately 200 countries. In 2000, it generated earnings of $4.4 billion on sales of $184.6 billion (see **Exhibit 1** for GM's consolidated income statement). The labor costs for its 365,000 employees in that year amounted to $19.8 billion, only $8.5 billion of which was for U.S.-based personnel. In addition to vehicles, other major product lines included (i) financial services for automotive, mortgage, and business financing, and insurance services through General Motors Acceptance Corporation (GMAC), (ii) satellite television and commercial satellite services through Hughes Electronics, and (iii) locomotives and heavy duty transmissions through GM Locomotive Group and Allison Transmission Division. GM traded on the New York Stock Exchange and was a component of the Dow Jones Industrial Average.

While North America still represented the majority of sales to end customers and the largest concentration of net property, plant, and equipment (see **Exhibit 2** and **Exhibit 3**), the importance of GM's international operations was growing as a percent of the overall business. With globalized production, these figures understated the degree to which intermediate goods in GM's supply chain moved around the world. Its market share in Latin America was 20% and in Europe had reached 10% (20% if Fiat's figures were included).[3] Increasing market share in Asia, which stood at 4%, was a major strategic objective for GM.

General Motors Treasurer's Office

GM's Treasurer's Office performed a full range of corporate treasury functions from its head office in New York and through additional locations in Brussels, Singapore and Detroit. The organizational structure shown in **Exhibit 4** demonstrates the nature and extent of those activities.

One of the key functions of the Treasurer's Office was financial risk management. This included management of not only market risk (foreign exchange, interest rate and commodities exposures) but also counterparty, corporate and operational risk. **Exhibit 5** outlines the components of this function and demonstrates the high degree of centralization in approach.

All of GM's financial risk management activities were subject to oversight by the Risk Management Committee, which was composed of six of GM's most senior executives including

[2] Statistics drawn from General Motors, 2001 Annual Report (Detroit: General Motors, 2002) and General Motors, December 31, 2001 10-K (Detroit: General Motors, 2002).

[3] General Motors owned 20% of Fiat, and Fiat held an option to put the remaining 80% to GM.

Feldstein.[4] The committee met quarterly to review the performance of GM's financial risk management strategies and to set treasury policy for GM and its subsidiaries. Treasury policy included evaluating the parameters and benchmarks for managing market risks, determining criteria for assessing counterparty credit risk, determining thresholds for property and liability insurance coverage, as well as reviewing internal control aspects of operating policies and procedures. GM's formal, company-wide policies contained not only broad principles, but also detailed execution procedures such as, in the case of foreign exchange risk management, the types of instruments to be used and the appropriate time horizons.[5] At its meetings the committee also discussed any special topics that needed to be addressed. Such special topics often included precisely the deviations from usual policy Feldstein was currently considering.

Various groups within the Treasurer's Office were involved in the implementation of financial risk management policy. For foreign exchange, all of GM's hedging activities were concentrated in two centers:

- The Domestic Finance group in New York handled FX hedging for GM entities located in North America, Latin America, Africa and the Middle East
- The European Regional Treasury Center (ERTC) was GM's largest foreign exchange operation, covering European and Asia Pacific FX exposures

FX hedging activities were segregated in this way on the principle that there should be some geographic correspondence between where a business unit was actually managed and where treasury for that business was controlled. At the same time, though, it was considered desirable to reap the benefits of pooling exposures across groups. In a sense, the goal was to match treasury management to the footprint of the business. Having local market knowledge and a trading center in both the European and U.S. time zones was also very helpful, because GM was active in each of the major foreign exchange markets.

In managing the FX exposures, both the Domestic Finance group and the ERTC worked closely with other groups within Treasury that had the primary responsibility of providing strategic support to GM entities within that region. These groups were also the global coordinators for intercompany loans, moved cash around the world to finance overseas mergers and acquisitions activities, and managed dividend repatriations.

Review of Corporate Hedging Policy

General Motors's overall foreign exchange risk management policy was established to meet three primary objectives: (1) reduce cash flow and earnings volatility, (2) minimize the management time and costs dedicated to global FX management, and (3) align FX management in a manner consistent with how GM operates its automotive business. The first constituted a conscious decision to hedge cash flows (transaction exposures[6]) only and ignore balance sheet exposures (translation exposures[7]).

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[4] Other members of the Risk Management Committee were the Chief Financial Officer, the General Auditor, the Chief Accounting Officer, the Chief Economist, and a senior executive from General Motors Acceptance Corporation (GMAC), GM's financial services subsidiary.

[5] GM policy specified, for example, which risks were to be hedged using forward contracts rather than options contracts.

[6] Transaction exposures are the gains and losses that arise when transactions are settled in some currency other than a company's reporting currency. These exposures stem from buying and selling activities as well as financing decisions such as

The second objective was a consequence of an internal study that determined that investment of resources in active FX management had not resulted in significant outperformance of passive benchmarks. As a result, policy was changed and a passive approach replaced the active one. The third reflected a belief that financial management should somehow map to the geographic operational footprint of the underlying business.

Passive Policy: Hedge 50% of Commercial (Operating) Exposures

The policy adopted was generally to hedge 50% of all significant foreign exchange commercial (operating) exposures on a regional level.[8] GM policy differentiated between "commercial" exposures—cash flows associated with the ongoing business such as receivables and payables—and "financial" exposures such as debt repayments and dividends. GM policy also outlined what sorts of derivative instruments were to be used for hedging.

Commercial (operating) exposures With operations, sales units, and investments spanning the globe, GM had direct or indirect commercial exposures to virtually every meaningful currency. Each regional center collected monthly forecasts of accounts receivable and accounts payable, usually for the twelve coming months, from all of the GM entities within its region and totaled the net exposures (receivables minus payables) by currency pair.[9] This information was compiled into a matrix presenting the exposure totals by currency pair for each regional unit (General Motors North America, General Motors Europe, General Motors Asian Pacific, and General Motors Latin America, Africa, Middle East) and then aggregating them up to a corporate grand total for General Motors as a whole. (See **Exhibit 6** for the summary of exposures by currency pair.) In practical use, this provided GM executives with granular information about the currency exposures created by ongoing business operations.

A determination of *"riskiness"* was then made on a regional basis, deciding which FX exposures were significant enough to warrant hedging. This determination was governed by the following formula:

Implied risk = Regional notional exposure x Annual volatility of relevant currency pair

For example, if GM-North America's (GMNA) forecasted 12-month euro exposure was a $400 million net payable at December 31, 2000, this difference of euro receivables less euro payables would represent the notional euro exposure for GM's North America region. Given the annual volatility of the euro versus the U.S. dollar of 12%, this suggested an implied risk of $48 million. For all implied

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borrowing. For further detail see W. Carl Kester and Richard P. Melnick, "Note on Transaction and Translation Exposure," HBS Case No. 288-017 (Boston: Harvard Business School Publishing, 1987, rev. 1992).

[7] Translation exposures are the gains and losses that arise when the assets and liabilities of a multinational's foreign subsidiary are translated back into the multinational's reporting currency for the purposes of preparing consolidated financial statements. For further detail see Kester and Melnick, "Note on Transaction and Translation Exposure."

[8] The fact that exposures were managed regionally meant that although there might be offsetting exposures in different regions, each region's exposure would still be separately hedged. For example, if with respect to the British pound GM-Europe had a net receivables position $1 million and GM-Asia Pacific had a net payables position of $1 million, each region's GBP exposure would be hedged even though GM as a consolidated entity had no net exposure before or after this hedging activity took place.

[9] The business units were permitted some flexibility in netting across months so long as they established a currency hedge through their treasury center. For example, if $20 million net receivables exposure in one month was likely to be offset by a $15 million payables exposure in the next month in the ordinary course of business, the net exposure of $5 million could be hedged with a forward contract and a currency swap used to hedge the risk involved in the timing difference.

risks of $10 million or greater, the regional exposure was required to be hedged. In the case of particularly volatile currencies, exposures were only hedged for the coming six months rather than twelve, and the implied risk threshold was lowered to $5 million. In practice, GM's overseas operations were large enough that all major currencies exceeded this threshold in one or more regions.

Net exposures within a region were then hedged to a *benchmark hedge ratio* of 50%. For example, half, or $200 million, of GMNA's notional euro exposure of $400 million would be hedged.

Having calculated the forecasted net exposure to a particular currency for each of the coming twelve months, the regional treasury center was then bound to use *particular derivative instruments* over *specified time horizons*: forward contracts to hedge 50% of the exposures for months one through six and options to hedge 50% of the exposures for months seven through twelve. Assuming that GMNA's $400 million euro exposure was distributed evenly over the twelve months of 2001, the $200 million exposure for months one through six would be hedged through forward contracts on $100 million, and the $200 million exposure for months seven through twelve would be hedged through options on $100 million. In general, at least 25% of the combined hedge on a particular currency was to be held in options in order to assure flexibility.

The evolution of the rolling forward twelve months naturally became more complicated when the exposures were not evenly spread across time (see **Exhibit 7**). First, as months rolled closer (cash flow *G* from month seven to six in **Exhibit 7**), the Treasury group replaced or supplemented options-based hedge positions with forward contracts, sometimes selling options previously purchased. This meant that the balance of forwards and options used to hedge the year ahead was constantly changing—and according to policy, options had to make up 25% of hedge positions. Second, the forecasts that the Treasury group received from managers in the operating subsidiaries frequently changed from month to month. This created situations where hedging actions from the previous month left the Treasury group either over- or under-hedged due to changing expectations.

Treasury centers were also expected to monitor the economic performance of their hedges and to readjust cover to levels which matched the levels achieved by a simulated benchmark hedge portfolio. This was done on a *delta basis*. The delta provided a measure of how effectively a particular instrument covered a risk, taking into account the probability that the instrument would be exercised. Forward contracts therefore had a delta of 100%. In purchasing currency options, GM sought to buy at-the-money-forward options that had an expected delta of 50% upon execution. Given the required mix of forwards and options in hedging an exposure, the hedge ratio of 50% initially corresponded, on a delta basis, to a hedge ratio of 37.5%. Taking again GMNA's euro exposure as an example, the first six months were hedged on a delta basis at the notional hedge ratio (50%) times the forward contract delta (100%) or a delta hedge ratio of 50%. Similarly the last six months were hedged notionally at 50% and using options with a 50% delta, which combined to a 25% delta hedge ratio. The average delta hedge ratio over the entire hedging horizon was therefore 37.5% at the outset.

Over time, the delta hedge ratios of both the actual and the benchmark hedge portfolios could be expected to depart from the initial 37.5%, primarily due to sensitivity of the value of options to movements in spot rates. Experience suggested that the delta hedge ratio of the benchmark portfolio would fluctuate somewhere between 30% and 45%. In addition, the delta hedge ratio of the actual portfolio would often vary from that of the benchmark portfolio because of the practical difficulties in executing exactly in line with the benchmark. A tolerance of +/- 5% was therefore allowed in matching the delta cover of the actual portfolio to the cover of the benchmark portfolio. It was also possible, on an exception basis, to deviate from a passive hedging strategy and take a view on the

future direction of a particular FX rate. Regional approvals were required in any such case. Even then, delta and notional cover levels had to be kept within certain prescribed ranges.

Commercial exposures (capital expenditures) Because capital expenditures did not exhibit the same month-to-month volatility or changing forecasts, GM adopted a different approach to hedging them. Unlike uncertain cash flows, planned investments (purchases of fixed assets or equipment) that met either of the following two tests were hedged with forward contracts using a 100% hedge ratio to the anticipated payment date: (i) amount in excess of $1 million, or (ii) implied risk equivalent to at least 10% of the unit's net worth. Such exposures were generally treated separately from ordinary commercial exposures.

Financial exposures Other known cash flows, including loan repayment schedules and equity injections into affiliates were hedged on a case-by-case basis. Generally they were structured so as to create as little FX risk as possible, and as a rule of thumb they were also 100% hedged using forward contracts. Dividend payments, on the other hand, were only deemed hedgeable once declared, and even then were hedged in the same manner as ordinary commercial exposures, i.e. a 50% hedge ratio.

Translation (balance sheet) exposures Translation exposures were not included under GM's corporate hedging policy. Nonetheless, they could on occasion become large enough to warrant the attention of senior finance executives, and Feldstein therefore kept abreast of all such situations. Such exposures were closely related to management's determination of a subsidiary's functional currency, a topic discussed in **Appendix B.**

Accounting treatment One of the goals of GM's hedging policy was to reduce earnings volatility. This goal was challenging given that, under the prevailing accounting standards (FAS 133), the forwards and options GM would use generally had to be marked-to-market and the gains and losses flowed through the income statement. At the same time, the underlying exposure being hedged was, in the case of commercial exposures (forecasts of receivables and payables up to 12 months in advance), often not on the books at all, and therefore changes in its market value did not hit the income statement. This mismatch was a potential source of earnings volatility.

FAS 133, however, provided the possibility of hedge accounting treatment for an exposure and associated hedge position. If the requirements for hedge accounting treatment were met, the above described earnings volatility was neutralized by taking gains and losses on the hedges to a shareholder's equity account in the balance sheet pending the realization of gains and losses on the underlying hedged exposures. Ultimately, gains and losses on the hedges would be released through the income statement contemporaneously with the recognition in the income statement of the gains and losses on the underlying exposures. Unfortunately, due to the complexity of compliance with hedge accounting regulations only a few of GM's more significant currency pairs were initially targeted for compliance.[10]

Reporting Hedging activities were closely tracked and regularly reviewed within the Treasury Group. The information was made available to senior management and to the Risk Management Committee to assist in policy review and creation. It was this internal monitoring that had led, just a few years earlier, to the decision to shift away from active FX risk management to passive management.

[10] Compliance was voluntary: by providing extensive proof that derivative transactions were entered into for the purpose of hedging and by establishing the effectiveness of the hedge, companies could obtain hedge accounting treatment for the combined position and avoid asymmetric mark-to-market treatment of the underlying exposure and hedge position.

Monthly Review—the Canadian Dollar

GM-Canada was an integral part of GM's worldwide production process. In addition to serving the Canadian domestic market, it served as a core supplier to other GM operations in North America, especially those in the United States, and it also relied on many U.S. based suppliers. At GM-Canada the U.S. dollar-denominated flows were so large that the U.S. dollar was effectively the primary operating currency of the company. As a result, accounting standards required that the U.S. dollar be selected as the functional currency despite GM-Canada's very large Canadian dollar assets and liabilities. The rules on determining the choice and consequences of a subsidiary's functional currency are explained in **Appendix B**. **Exhibit 8** illustrates how a change in exchange rates impacts GM's financial statements under two different scenarios: (i) when a subsidiary's functional currency is the U.S. dollar; and (ii) when a subsidiary's functional currency is its local currency.

Since GM-Canada's functional currency was the U.S. dollar, its exposure to the Canadian dollar was recognized as a foreign currency exposure. The income statement impact arose from gains and losses on both the CAD-denominated cash flows (see **Exhibit 9**) and on the balance sheet CAD net monetary liability position (see **Exhibit 10**). Both exposures were equivalent to short positions in the Canadian dollar. The net payable cash flow exposure resulted largely from payments due to Canadian suppliers, and the size of the net monetary liability stemmed mainly from future pension and postretirement benefit obligations to employees in Canada.

GM's passive hedging policy called only for hedging 50% of the CAD 1.7 billion cash flow exposure projected over the subsequent twelve months. Nonetheless, Feldstein acknowledged that GM's policy of not hedging the translation exposure stemming from the CAD 2.1 billion net monetary liability left a large CAD exposure that could impact GM's year-end financial results significantly.

Feldstein therefore met with his FX and Commodities Manager, Doug Ostermann, who was proposing to increase the hedge ratio for the CAD to the maximum allowed under GM policy—75%. The internal memorandum requesting permission to deviate so far from the standard 50% policy read as follows:

> Historically, GMNA has a short CAD commercial exposure of approximately CAD 1.6 – 1.8 billion, primarily due to CAD denominated supplier payments being larger than CAD denominated sales.... In order to reduce global earnings volatility at year-end, we recommend to hedge up to 75% of GMNA's commercial exposure (approximately 30% hedging ratio for the balance sheet exposure). According to the FX policy, any deviation from the passive hedging strategy (50% notional hedging ratio), requires the approval...

Feldstein felt he needed a comparison of the income statement impact of a 75% versus a 50% hedge ratio. The proposal suggested that a plus-or-minus 3.1% move around the 1.5780 exchange rate on the date of the memo be examined. Using these scenarios Ostermann could do a sensitivity calculation with a favorable scenario (gain due to FX movements) and an unfavorable scenario (loss due to FX movements) based on the after-tax gain/loss impact from the projected CAD cash flow as well as from the CAD net monetary liability. By dividing this amount by the 550 million shares GM had outstanding, Ostermann could determine how much the proposed deviation would reduce EPS volatility. To simplify the calculation, Ostermann ignored the costs of hedging (such as option

premiums). Additionally, Ostermann wanted his analysis to reflect the "excess cash" of CAD 660 million held by GM Canada.[11]

As Feldstein prepared to make a decision about the CAD deviation, he had to keep in mind both what economic risks he wanted to hedge and what was called for under GM's corporate hedging policy.

Implementing a Foreign Exchange Hedge

If Feldstein signed off on this deviation, Mercedes Michel and the team in Domestic Finance would oversee putting on the hedge position. Michel was in regular communication with several of the largest currency-dealing banks and maintained up-to-date price quotations. On any day when GM was active in the market adjusting its hedge positions, she was on the phone with the banks virtually all day getting quotations and executing trades. On an ordinary day, she could get most of the information she needed from electronic data sources. When a hedge position was being created or modified, she handled transactions in both forward and options contracts.

Suppose on September 15, 2001 Michel needed to hedge a CAD 10 million cash outflow three months in the future (in other words, 50% of a CAD 20 million notional exposure). First, she checks the market price levels using a Bloomberg terminal. The spot price on the CAD/USD exchange rate is bid-ask of 1.5621-1.5624. (Spreads were very small when transacting in significant amounts in the currency markets; players typically only referred to the last two digits of the spread because it was assumed that buyers and sellers knew the levels to the $1/100^{th}$ of a point.) With that information she dials one of her regular bankers:

Michel: Can you give me a two-way price on 10 Canada?

Trader: CAD spot is 21 to 24.

Michel: I'll do it at 21.

Trader: So, you are buying 10 million Canadian dollars against U.S. dollars at 1.5621.

Michel: Actually, I want to roll it 3 months out. Can you tell me the forward points?

Trader: That's 45 points.

Michel: Can you improve it a pip?

Trader: Humm...OK...You get it at 46.

Michel: Done. Thanks.

Trader: Good. Then GM buys 10 million Canadian dollars at 1.5667 and sells USD 6,382,842.92 with value December 17, 2001.

Michel: Agreed. Bye.

Now assume that instead of hedging the exposure with a forward contract, Michel needed to use a currency option to hedge the CAD 10 million exposure. Michel will buy a CAD call / USD put with a notional amount of CAD 10 million. Assume the spot price is 1.5621. Again, before calling the

[11] Total cash or cash equivalents held by GM Canada was CAD 683; Ostermann estimated CAD 660 of this amount was "excess cash."

trader, Michel checks Bloomberg to find the forward rate—1.5667 in this example. Michel will use this as the strike price for a 3-month at-the-money-forward (ATMF[12]) CAD call / USD put.

Michel: Can you give me a price for a CAD call / USD put with delta exchange?[13]

Trader: Sure. Give me the details.

Michel: I need a 10 Canada call, maturing on December 17th, with a strike price of 1.5667 and delta exchange at 1.5621. Can you give me the premium price as a percentage of USD?

Trader: Yes. Hold on a moment...So, the strike is at 50% delta[14]...the premium price is 1.45% of USD offered.

Michel: Let's see. The U.S. dollar put amount is 10 million divided by 1.5667, that's USD 6,382,842.92; that times 1.45% makes the premium amount 92,551.22 U.S. dollars. Let's do it.

Trader: Done. GM buys a 10 million Canadian dollar call / U.S. dollar put with maturity on December 17, value December 18, at a strike of 1.5667. On the delta exchange GM sells CAD 5 at 1.5621.

Michel: Agreed. Bye.[15]

Comparing Forward Contracts with Options

Because GM's hedging operations constituted a substantial volume of currency trading, GM was concerned with executing its hedging policies in a cost efficient manner. Forward contracts and options, however, were not easily comparable on straight cost basis. A forward contract was always a zero cost contract on the trade date, whereas buying an option involved paying a premium. Thus, the treasury group needed a different way of analyzing the two strategies with respect to one another. The framework devised by the Treasury group involved comparing how one strategy or the other would have fared at the different possible exchange rates that might prevail at the future date (the date of the exposure to hedge).

Specifically, it compared: (1) the combination of the outright exposure plus a 50% hedge using forward contracts, with (2) the combination of the outright exposure plus a 50% hedge using options. On a graph of future spot prices (x-axis) against cash flow payoff (y-axis), these two produced lines that intersected. That point of intersection represented a sort of break-even point—if GM Treasury's expected future spot exchange rate was different from that point, GM could choose the strategy that was more profitable.

Forward contracts Continuing the example from Michel's conversations with traders above, Michel constructed a spreadsheet that considered a range of future spot rates of 1.4000 to 1.8000 CAD

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[12] Rather than being at-the-money with respect to the spot price, such an option is at-the-money with respect to the forward price.

[13] The delta exchange effectively allowed the bank to offer a price quotation based on a fixed spot rate (of 1.5621 in this case). As a result, GM was able to contact multiple banks and obtain competitive price quotations and select the best one for executing the options trade. **Appendix A** discusses the mechanics of a delta exchange in detail.

[14] An at-the-money-forward option was characterized by a delta (sensitivity to changes in the underlying exchange rate) of 50%.

[15] Michel might have asked the trader to hold the price quotation while she contacted other banks in search of a better price. The fact that she immediately executed the trade with this trader suggests that she had already called two other banks and that their price quotations were not as competitive.

per USD. The outright exposure measured the foreign exchange gain or loss GM would recognize on the CAD 20 million position. At a 50% hedge, Michel knew she had to layer on a CAD 10 million hedge at a forward price of 1.5667. This would produce a partially offsetting cash flow in the future. The sum of the outright gain/loss and the cash settlement of the forward contract amounted to the net consequence of a forwards strategy.

Options contracts Instead, Michel could layer on top of the outright exposure just calculated an option contract purchase. The sum of the outright exposure and the option payoff amounted to the net consequence of an options strategy. The option characteristics were as described above: a strike price equal to the forward price of 1.5667 and a premium cost of 1.45% of the notional hedge amount. When the option was in the money, the contract returned a profit (less the premium), whereas when it expired out of the money, the gain (loss) on the outright exposure was reduced (increased) by the premium amount.

Special Situations—the Argentinean Peso

Argentina presented GM Treasury with another set of critical decisions arising from the increasing macroeconomic uncertainty facing GM's extensive operations there. In order to control historic inflationary tendencies, the government maintained a peg to the U.S. dollar at USD 1 : ARS 1. With $16.5 billion of foreign loans coming due in 2002, Argentina was now at serious risk of defaulting on its debt. Credit analysts at Standard & Poor's and Moody's had downgraded Argentina to six and seven grades below investment grade, respectively. GM Treasury's Latin America experts believed the short-term probability of default had reached 40%. In the medium term, their assessment of that probability rose to 50% because Argentina had not addressed key issues such as trade liberalization, state reform, and pension and healthcare reform. A default would very likely be accompanied by a large devaluation.

The treasury analysts had provided Feldstein with information on GM's position in Argentina, including the ARS and USD denominated components of the balance sheet (see **Exhibit 11**). Feldstein considered how a potential devaluation of the peso against the dollar from 1 : 1 to 2 : 1 would impact GM Argentina.

Hedging the Peso Exposure

Michel had evaluated how costly it would be to hedge the ARS exposure in the financial markets. For her analysis, she reviewed the market for forwards and options on the ARS and compiled historical prices on one-, six-, and twelve-month forward rates of the peso vs. the dollar (see **Exhibit 12**). Feldstein's first observation was the rapid rise in forward rates over the recent months. Michel calculated the costs of hedging a $300 million exposure based on rolling over shorter term contracts or purchasing year-long contracts (see **Exhibit 13**).

These figures led Feldstein to consider other means of mitigating the impact of a likely devaluation. Feldstein hoped to find some natural business hedges or creative ways to reduce peso-denominated assets and substitute peso-denominated liabilities for hard currency-denominated ones. Local managers had already taken some steps to cope with the expected devaluation. GM Argentina had eliminated peso cash balances and transferred them in USD to the European Regional Treasury Center, and Feldstein knew that managers of the subsidiary were considering various strategies to bring in revenues in more stable foreign currencies. The situation in Argentina was more complex than a one-time currency deviation request because a devaluation would have an ongoing impact on

the subsidiary. Feldstein and Ostermann needed to decide how to proceed: was it worth the costs to increase the size of GM's hedge position beyond what was required by usual policy? Should GM Argentina rely on other approaches to cope with the expected devaluation?

Conclusion

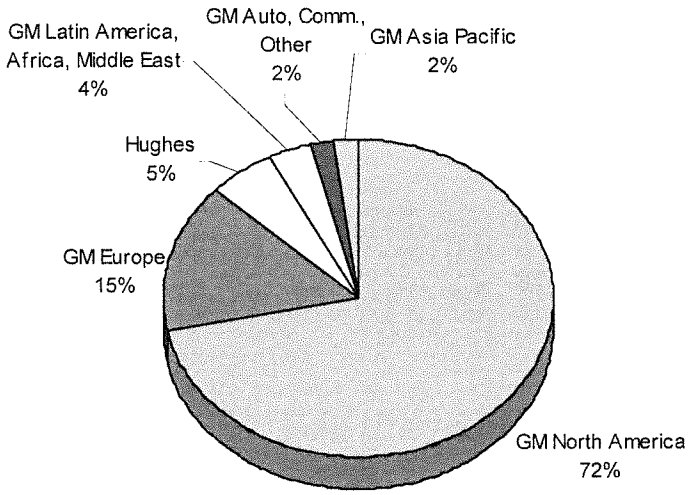
Feldstein had a great deal of thinking to do. The two cases under consideration—the CAD deviation and the ARS deviation—were not simple ones. He had to balance the dictates of GM's hedging policy with concerns about how markets would respond to changes in the exchange rates and the potential consequences of GM's significant exposures to each of these currencies. It was important for him to understand not just what the policy permitted, but what the economics of each exposure were, and what was best for GM as a consolidated global entity in each case.

Exhibit 1 GM Consolidated Income Statement

December 31, *($ millions)*	2000	1999	1998
Total net sales and revenues	184,632	176,558	155,445
Cost of sales and other expenses	145,664	140,708	127,957
Selling, general, and administrative	22,252	19,053	15,915
Interest expense	9,552	7,750	6,629
Earnings before taxes and minority interests	**7,164**	**9,047**	**4,944**
Income tax expense	2,393	3,118	1,636
Equity income (loss) and minority interests	(319)	(353)	(259)
Income from discontinued operations	-	426	(93)
Net income	**4,452**	**6,002**	**2,956**
Dividends on preference stocks	(110)	(80)	(63)
Earnings attributable to common stocks	**4,342**	**5,922**	**2,893**

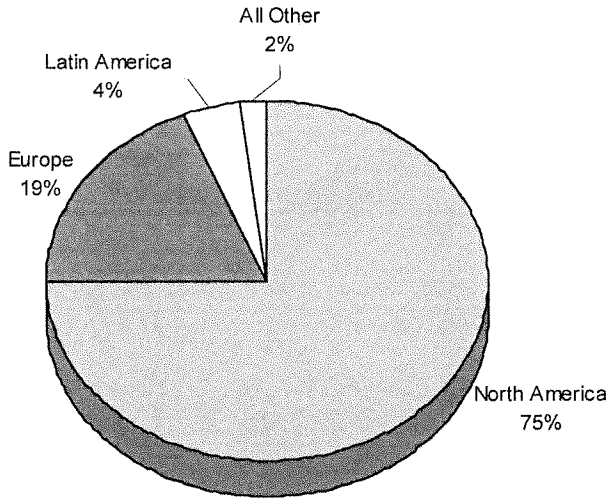
Source: General Motors, December 31, 2000 10-K (Detroit: General Motors, 2001).

Exhibit 2 GM Segment Breakdown of Sales to End Customers, 2000



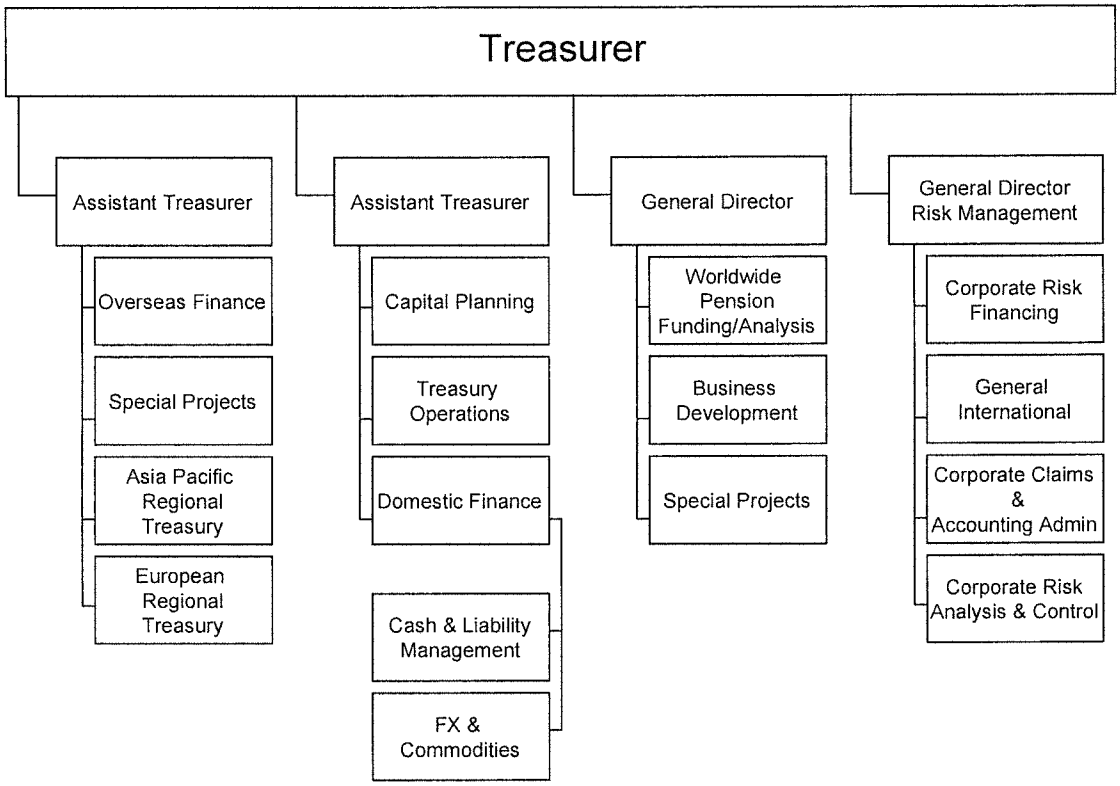
Source: General Motors, 2001 Annual Report (Detroit: General Motors, 2002).

Exhibit 3 GM Geographic Breakdown of Net Property, 2000



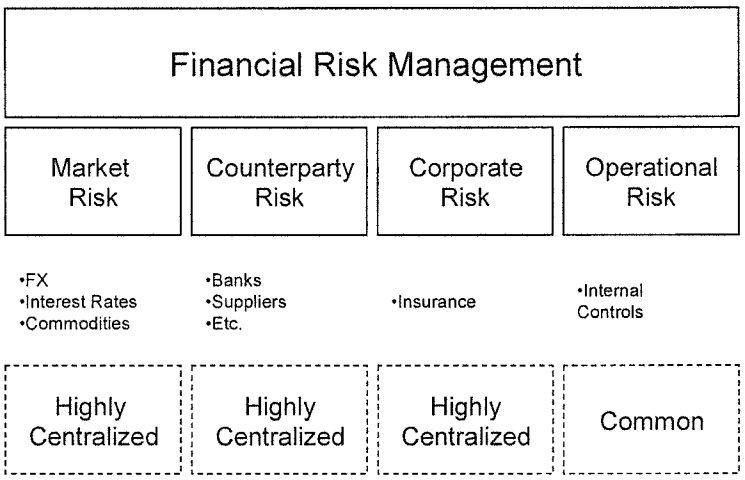
Source: General Motors, 2001 Annual Report (Detroit: General Motors, 2002).

Exhibit 4 GM Treasury Group – Organizational Structure



Source: Company documents.

Exhibit 5 GM Treasury Group – Functional Structure



Source: Company documents.

Exhibit 6 GM's Largest Currency Exposures (Forecasted Receivables Less Payables)

As of 12/31/00 ($millions)	USD	EUR	JPY	GBP	SEK	AUD	CAD	CHF	PLN	MXP	OTHER
GMNA	800	(400)	-	-	(200)	-	(1,400)	-	-	1,200	-
GME	400	(2,400)	200	1,400	(800)	400	(200)	400	200	-	800
GMAP	200	(200)	200	200	-	200	-	-	-	-	200
GMLAAM	600	(400)	500	-	-	-	-	-	-	-	-
GM Total	**2,000**	**(3,400)**	**900**	**1,600**	**(1,000)**	**600**	**(1,600)**	**400**	**200**	**1,200**	**1,000**

Source: General Motors
Figures have been disguised and do not reflect the actual operations of General Motors Corp.

NOTES:

GMNA: General Motors North America
GME: General Motors Europe
GMAP: General Motors Asian Pacific
GMLAAM: General Motors Latin America, Africa, Middle East

Exhibit 7 Evolution of Net Receivables / Payables Exposure, Rolling Forward Twelve Months

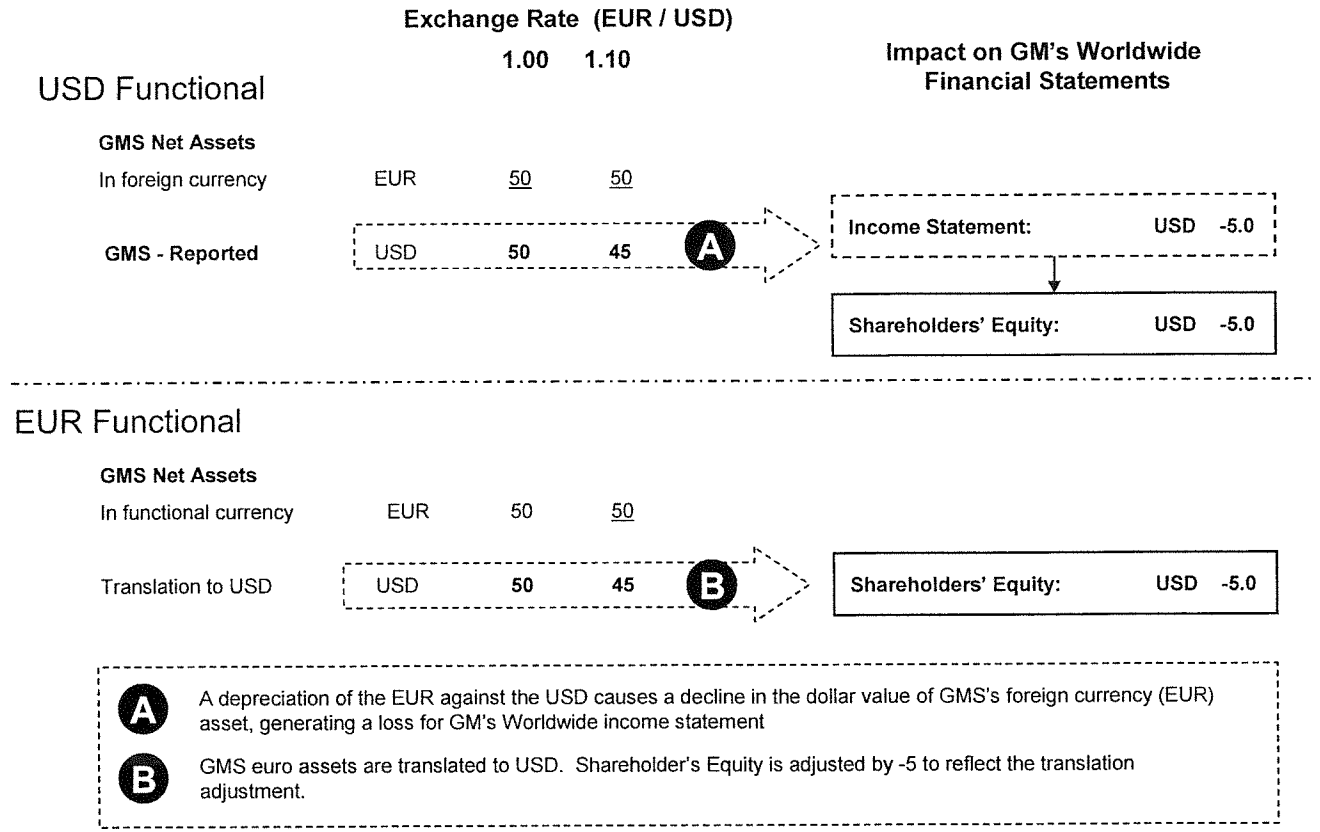
Month	1	2	3	4	5	6	7	8	9	10	11	12
	FORWARDS						OPTIONS					
t=0 CFs	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*
t=1 CFs	*B**	*C**	*D**	*E**	*F**	*G**	*H**	*I**	*J**	*K**	*L**	*M**

Source: Casewriter analysis.

(*) Forecasts received from operations managers for future months may change from month to month.

Exhibit 8 Example of the Impact of a Change in Exchange Rates on GM's Financial Statements

The example below considers what happens to the worldwide financial statements of GM when one of its subsidiaries holds an asset that changes in value due to an exchange rate move. Specifically, GM's hypothetical subsidiary in Strasbourg, GMS, has cash assets of 50 euros. For reasons discussed further in **Appendix B**, it is possible that the functional currency of the subsidiary could be either the USD or the euro. If the euro depreciates 10% against the USD, the impact of the change in the EUR/USD exchange rate on GM's worldwide financial statements depends on whether the subsidiary's functional currency is the USD or its local currency, the EUR.



Source: Casewriter analysis.

Exhibit 9 GM Canada – Projected Cash Flow Exposure

Cash Flows	Amount as of September 30, 2001
INFLOWS	
Canadian sales	10,564
Tax refunds (GST)	1,049
OUTFLOWS	
Material purchases	(10,180)
Capital expenditures	(113)
Other structural costs	(1,737)
Tax expenditures	(1,258)
Other expenditures	(6)
12 month C$ cash flow forecast	**(1,682)**

Source: Company documents.
Figures have been disguised and do not reflect the actual operations of General Motors Corp.

Exhibit 10 GM Canada – Net Monetary Asset/Liability Exposure

Balance Sheet Account	Amount as of September 30, 2001
ASSETS	
Cash & cash equivalents	683
Accounts & notes receivable	271
Deferred income taxes	118
Pension asset	1,525
LIABILITIES	
Outside – all other	(93)
Other postretirement benefits	(1,949)
Warranty	(132)
Accounts payable and other	(2,565)
C$ Monetary asset / (liability) position	**(2,143)**

Source: Company documents.
Figures have been disguised and do not reflect the actual operations of General Motors Corp.

Exhibit 11 GM Argentina Balance Sheet, Monetary Assets and Liabilities by Currency, as of September 30, 2001

ARS Monetary Assets		ARS Monetary Liabilities	
Scrap incentive owed by govt.	45.8	Payables to local suppliers	24.1
Interest subsidy owed by govt.	3.2	Provisions to local suppliers	11.3
VAT credit and other tax owed by govt.	130.6	ARS loan (VAT financing)	13.7
Receivable (tax credit reimbursement)	2.7	Other provisions	9.8
Other	7.8	Tax payable	2.0
Total	**190.0**	**Total**	**60.9**

USD Monetary Assets		USD Monetary Liabilities	
Cash	2.5	Accounts payable	224.5
Receivables	20.5	Loans	101.3
Total	**23.0**	**Total**	**325.7**

Source: Company documents.
Figures have been disguised and do not reflect the actual operations of General Motors Corp.

Appendix A Mechanics of a Currency Option Purchase with a Delta Exchange

Key variables for a currency option (1) Spot exchange rate, 1.5621; (2) forward rate (sometimes stated in forward points or forward premium), 1.5667; (3) strike price (an exchange rate), 1.5667; (4) risk free interest rate in both currencies, available instantly from Bloomberg; (5) time to expiration, three months; and (6) volatility of the currency pair, the price quoted by the bank.

What happens when GM buys an option from a bank? After Michel and the trader agree on a price and the bank has written an option, the bank has taken on a naked option position. However, the bank usually does not take currency positions for the purpose of gain, but instead acts as an intermediary and earns a commission on each trade. As a result, it wishes to eliminate the exposure created by having written the option to GM. Typically the bank does so by immediately creating an offsetting position. It might be that the bank has another client who wants to take the exact opposite side of the option GM bought. This is rare, however, and the bank normally resorts to "delta hedging." At any given point in time, an option has some price sensitivity to the underlying asset price. For example, if an exchange rate appreciates one percent, this would increase the value of a call on that currency. The amount by which the call value increases is called the delta. If a bank is short an option on CAD 10 million but has bought CAD 5 million and the option has a delta of 50%, then the bank is perfectly hedged: if the CAD exchange rate appreciates one percent, the short option will lose one percent on CAD 10 million times 50%, but the long currency position will gain one percent on CAD 5 million times 100% in value. (The delta of a long position in the underlying asset is necessarily one.) As the spot rate changes, the bank will have to increase and decrease the size of its delta hedge position so that changes in the exchange rate will always create offset gains and losses on the option and delta hedge positions.

What if GM wants to get competitive price quotations? In order to get multiple price quotations, it is necessary to call several banks. This requires that the first bank called agrees to leave its quoted price open for some time while GM accumulates other price quotations. Spot rates, however, change constantly, so no bank will leave a price quotation open for long. GM must, therefore, find a device that protects the bank against changes in the spot rate between getting the price quotation and calling back to execute the trade. In effect, GM must promise to help the bank retroactively create the delta hedge that the bank would have created on its own, had the order been placed during the same phone call that the price quotations was given.

What is a "delta exchange" Mechanically, by agreeing to the delta exchange, GM is agreeing to act as the counterparty for the bank's delta hedging transaction at the spot rate prevailing when the option price quotation was given. This protects the bank's ability to hedge the option exposure. It also requires that GM purchase CAD 5 million on the spot market before placing the option trade so that when it purchases the option from the bank it has CAD 5 million on hand to sell to the bank when it is called upon to complete the delta exchange.

Appendix B Understanding the Choice and Consequences of a Subsidiary's Functional Currency

When U.S. multinationals establish new overseas subsidiaries, management is required to determine whether the functional currency for each overseas subsidiary should be the local currency or the U.S. dollar. Under SFAS 52, the functional currency should be the primary operating currency of that subsidiary. (There is one exception: parent companies are required to use their own reporting currency in highly inflationary economies.) A self-contained unit with substantial local currency receipts and expenses should select the local currency as its functional currency. However, a subsidiary that purchases much of its raw inputs from a U.S. parent or sells a substantial part of its production to its U.S. parent each year—in short, operations that are essentially an extension of the parent company's business—should select the U.S. dollar as its functional currency. While the selection of a subsidiary's functional currency does not change the economic realities of the business or its operations, it does change how a company reports the changes in value resulting from fluctuating exchange rates.

The following simple example illustrates the consequences when a subsidiary's functional currency is the USD and when a subsidiary's functional currency is its local currency (see **Exhibit 8** for an illustration of these issues). The example assumes the following:

- GM-Strasbourg (GMS) is a foreign subsidiary of GM, financed entirely by equity
- GMS has assets of €50 cash
- The euro depreciates 10% against the dollar, moving from €1.00=$1.00 to €1.10=$1.00

Functional currency is USD If GMS is very tightly integrated into its parents operations then its functional currency should be the same as its parent's reporting currency (U.S. dollars). GMS's cash holding of 50 euros is therefore considered a foreign currency exposure. A depreciation of the euro against the U.S. dollar reduces the value of GMS's euro holdings: the €50 that used to be worth $50 are now only worth $45. GM, as a consolidated entity, reports this on its income statement as a $5 foreign exchange loss. This reduction in net income flows through to the balance sheet reducing shareholder's equity (retained earnings) by $5.

Functional currency is the local currency If GMS is less tightly integrated into its parents operations, then it may use the local currency as its functional currency. When GMS uses its local currency (euros) as its functional currency, its Euro income statement is translated into USD upon consolidation. If the euro depreciates 10% against the dollar, then this translation will show a loss of $5. GM accounts for this loss by reducing its shareholder's equity (retained earnings) by $5.

The critical insight here is that if GMS's functional currency is the USD, then the impact of a euro depreciation can impact GM's income statement and, ultimately, will be reflected in shareholder's equity; if GMS's functional currency is its local currency, then the impact of the euro depreciation is recognized directly through an adjustment to GMs shareholder's equity.

Why does this treatment differ on the choice of the functional currency? The basic logic can be understood as follows:

> The economic effects of exchange rate changes on an overseas operating unit that is relatively self-contained and integrated within a foreign country relate primarily to the net investment in that unit. Translation adjustment gains or losses that arise from consolidating such foreign operations do not change the parent's cash flows. Consequently, in these cases...the local currency should be designated as the functional currency; and translation

adjustments should not be included in the consolidated U.S. dollar-denominated income, but rather be made directly to owner's equity.

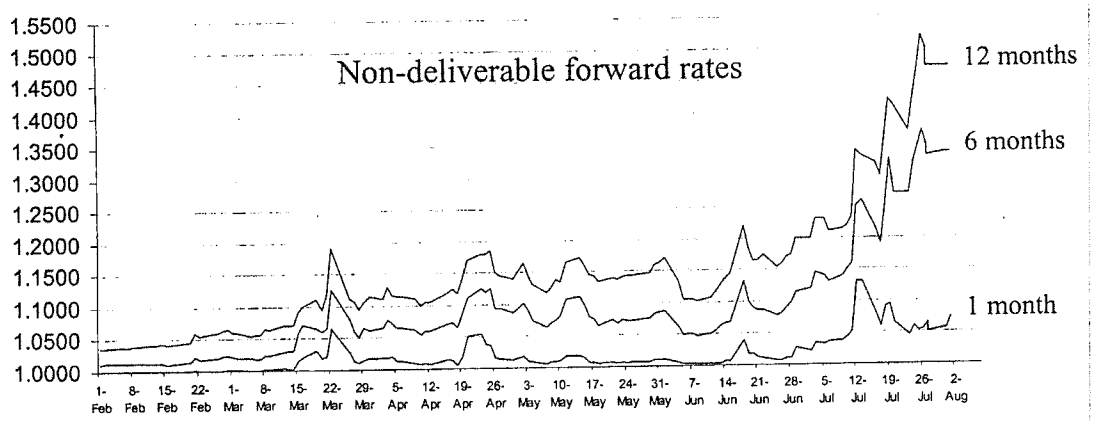
The economic effects of exchange rate changes on a foreign operation that is essentially an extension of the parent's domestic operations relate primarily to individual assets and liabilities and affect the parent's cash flow directly. Accordingly, the functional currency of such a business should be the U.S. dollar... and translation adjustments should be included in net income.[16]

For the purposes of analysis of the CAD exposure, this is why the CAD exposure of GM's Canadian subsidiary, a USD functional currency subsidiary, will impact GM's worldwide income statement.

[16] This quote is drawn from David F. Hawkins, "Measuring Foreign Activities," HBS No. 194-055 (Boston: Harvard Business School Publishing, 1995), p. 8. The note also contains a helpful discussion of the broader issues involved in measuring such exposures.

[16] As described above, the functional currency was determined by objective standards rather than a choice. This example contemplates a choice of functional currencies for illustrative purposes.

Exhibit 12 Argentinean Peso/U.S. Dollar Forward Rates by Contract Maturity



Source: Company documents.

Exhibit 13 Cost of Hedging the ARS Exposure in Argentina

Time Horizon / Hedging Period	Cost *($ millions)*
One-month Forward	$6.4
Three-month Forward	18.2
Six-month Forward	28.7
Twelve-month Forward	40.3

Source: Company documents.