

⁹¹ Stephen Roach, "In Search of Big Spenders; American consumers spend nearly \$9 trillion a year, or 20% more than Europeans. But the binge is now coming to an end," *Newsweek International*, September 11, 2006.

⁹² Roubini and Setser 2005, p. 2.

⁹³ This strategy is first outlined in Communiqué of the International Monetary and Financial Committee (IMFC) of the Board of Governors of the International Monetary Fund October 2, 2004, available at <http://www.imf.org/external/np/cm/2004/100204.htm>, accessed June 9, 2005. See also IMF World Economic Outlook 2005, pp. 114–115 and 26–27. The report proceeds by chiding the United States for being insufficiently ambitious with the fiscal goal, for failing to include expenses associated with Iraq and Afghanistan, and because of the substantial risk that the objective will not be met.

⁹⁴ See, for example, Testimony of Chairman Alan Greenspan before the Committee on the Budget, U.S. House of Representatives, "Economic Outlook and Current Fiscal Issues," March 2, 2005.

⁹⁵ *The Economist*, "Fiscal Fantasyland; America's budget," April 9, 2005.



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Foreign Exchange Hedging Strategies at General Motors

In September of 2001, Eric Feldstein, Treasurer and Vice President, Finance for General Motors, Corp. paid little attention to his unobstructed view of Central Park from his office far above the Manhattan traffic. He had three risk management decisions to make: what to do about (i) GM's billion dollar exposure to the Canadian dollar, (ii) GM's exposure to the Argentinean peso in light of the expected devaluation in the months ahead, and (iii) the continuing strategic concern about fluctuations in the Japanese yen, which figured so heavily into the cost structures of some of GM's competitors.

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 amount of 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 was reviewing proposals for the Canadian dollar (CAD), Argentinean peso (ARS), and Japanese yen (JPY). He had the authority to sign off on each deviation.

Professor Mihir A. Desai and Research Associate Mark F. Veblen prepared this case. 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.

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Overview of General Motors and its Treasury Operations

General Motors¹

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 included²). 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 Feldstein.³ 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

¹ Statistics drawn from General Motors, 2001 Annual Report (Detroit: General Motors, 2002) and General Motors, December 31, 2001 10-K (Detroit: General Motors, 2002).

² General Motors owned 20% of Fiat, and Fiat held an option to put the remaining 80% to GM.

³ 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.

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.⁴ 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 exposures⁵) only and ignore balance sheet exposures (translation exposures⁶). The second objective was a consequence of an internal study that determined that investment of resources in active FX management had not resulted in significantly outperforming passive

⁴ GM policy specified, for example, which risks were to be hedged using forward contracts rather than options contracts.

⁵ 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 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).

⁶ 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 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).

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.⁷ 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.⁸ 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:

$$\text{Implied risk} = \text{Regional notional exposure} \times \text{Annual volatility of relevant currency pair}$$

For example, if GM-North America's 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. Give the Euro's annual volatility versus the U.S. dollar of 12%, this suggested an implied risk of \$48 million. For all implied 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 notional euro exposure of GMNA's \$400 million would be hedged.

⁷ 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.

⁸ 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.

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 enough 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 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 certain 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. At the same time, they could on occasion become large enough to warrant the attention of senior finance executives, and Feldstein therefore kept abreast of any such situations. Such exposures were closely related to management's determination of a subsidiary's functional currency, a topic discussed below. Insofar as these exposures became significant and were not covered by stated hedging policies, they took on increased importance.

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.⁹

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.

Understanding the Choice of a Subsidiary's Functional Currency

When U.S. multinationals established new overseas subsidiaries, management was required to determine whether the functional currency for each overseas subsidiary would be the local currency or the U.S. dollar. Under FASB #52, the functional currency had to be the primary operating currency of that subsidiary. (There was one exception: parent companies were required to use their own

⁹ 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.

reporting currency in highly inflationary economies.) A self-contained unit with substantial local currency receipts and expenses had to select the local currency as its functional currency. However, a subsidiary that purchased much of its raw inputs from a U.S. parent or sold a substantial part of its production to its U.S. parent each year—in short, operations that were essentially an extension of the parent company's business—had to select the U.S. dollar as its functional currency. The choice of functional currency did not impact the consolidated entity's reporting currency, which was always the U.S. dollar in the case of U.S. multinationals.

While the choice of functional currency did not change the economic realities of the business and its operations, it did change how a company reported the changes in value resulting from fluctuating exchange rates. The following example illustrates the consequences of the choice of functional currencies (see Exhibit 8 for an illustration of these issues).

Imagine that GM-Strasbourg (GMS) has nothing but cash held in a U.S. dollar-denominated checking account and a euro-denominated checking account. The respective balances are \$100 and €50. The subsidiary is financed entirely with equity. Furthermore, assume for simplicity that the U.S. dollar and the euro are trading at parity. Suppose GMS has a choice whether to use the U.S. dollar or the euro as its functional currency.¹⁰ The difference between these alternatives is examined by tracing the consequences of a 10% devaluation of the euro against the U.S. dollar.

When GMS's functional currency is the same as GM's reporting currency (U.S. dollars), GM's consolidated income statement will include a gain or loss on the changes in value, as measured in U.S. dollars, of GMS's foreign currency denominated monetary asset/liability.¹¹ (GMS's income statement will show the same.) When GMS instead uses its local currency (euros) as its functional currency,

1. GM's consolidated income statement will include a gain or loss on the changes in value, as measured in GMS's local currency of GMS's non-local currency denominated asset/liability (GMS's income statement will show the same)
2. GM's balance sheet will show an adjustment to shareholders' equity for the translation to U.S. dollars of GMS's assets/liabilities.

The critical insight is that, while the overall impact of the devaluation of the euro will be the same regardless of the functional currency chosen, there is a difference in what impact is recognized in the income statement and what impact is recognized directly in the shareholders' equity of GM.

In the case where the dollar is chosen as the functional currency, the euro exposure is considered the foreign currency. The illustrative 10% 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. This \$5 loss is the economic impact on GM Worldwide (see Panel A in Exhibit 8 for an illustration). At the subsidiary level, that \$5 loss is similarly recorded as a decrease in value of the €50 that are held in the euro-denominated account. Both the subsidiary and GM as a consolidated entity report on their income statements a foreign exchange loss of \$5. This

¹⁰ 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.

¹¹ For completeness, it should be noted that there would be an income statement impact resulting from any GMS foreign currency denominated non-monetary assets such as inventory and fixed assets if the historical exchange rate at which these assets were carried on the books needed to be adjusted retrospectively.

reduction in net income flows through to the balance sheet reducing equity (retained earnings) by \$5.

In the next case, where the euro is the functional currency, GMS reports a \$100 foreign exchange exposure. When the euro depreciates, the value of GMS's foreign exchange exposure (\$100) changes. GMS's foreign currency-denominated asset (the \$100 checking account balance) must be remeasured into the functional currency and the gain of €11.1 (or \$10.0) is credited to the income statement. Upon consolidation, GMS's entire assets and liabilities of €161.1, including the \$100 checking account after remeasurement into euros, are translated into U.S. dollars. (See Panel B in Exhibit 8 for an illustration).

Feldstein realized that volatility in GM's earnings would to some degree depend on how GM accounted for the operations of its many subsidiaries. In particular, when considering policy deviations, it was important to understand which currency constituted a "foreign exchange" exposure from the perspective of the subsidiary—because it would be fluctuations in the value of that currency (as measured in dollars) that would affect GM's net income and retained earnings. Feldstein was less concerned with the foreign exchange adjustments to equity that did not flow through the income statement.

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).

GM-Canada therefore recognized its foreign currency exposure as a Canadian dollar 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.

Feldstein was aware of the fact that GM's passive hedging policy called 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 met with his FX and Commodities Manager, Doug Ostermann. Ostermann 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% of 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 the expected volatility of the CAD/USD exchange rate was plus-or-minus 3.1% around the 1.5780 exchange rate on the date of the memo. Using this volatility, 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. 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).

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 to adjust 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 1/100th 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 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 (ATMF¹²) 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% delta¹⁴...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.

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.

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 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 a real headache for GM's extensive operations there. In order to cure rampant inflation, the government exercised control over foreign currency exchange and maintained a peg to the U.S. dollar at USD 1 : ARS 1. With a debt-to-GDP ratio of 45% and \$16.5 billion coming due in 2002, the "zero-deficit" law passed by the Senate in 2001 put Argentina 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, the 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 undoubtedly be accompanied by a massive devaluation.

The Argentina situation appeared grim. Feldstein reviewed the figures before him. The treasury analysts had provided the ARS and USD denominated components of the balance sheet (see Exhibit 11)—and described a potential devaluation of the peso against the dollar from 1 : 1 to 2 : 1. Feldstein saw two immediate impacts. First, local currency equivalent of USD borrowings by GM Argentina (a local currency functional subsidiary) would grow, putting financial pressure on the subsidiary. In fact, the \$300 million USD net liability position would double in peso terms to an ARS 600 million liability. There would be a consequent ARS 300 million adverse income statement impact for the subsidiary. Second, there would be a substantial translation loss on GM Argentina's ARS denominated net assets when these net assets were consolidated in USD with all other assets of GM Worldwide. This loss would negatively impact consolidated shareholders' equity. With a few calculations, Feldstein figured the value at risk to GM—an amount that included the maximum EPS hit GM might be forced to take into net income in 2002 together with the shareholders' equity impact.¹⁶

¹⁶ In fact, the accounting consequences were more complex. As a local currency functional entity, GM Argentina would first convert all non-ARS denominated asset and liabilities to ARS. The gain or loss would be reflected in GM Argentina's income statement and ultimately impact the consolidated net income of GM Worldwide. On consolidation, the entire GM Argentina balance sheet, now denominated exclusively in ARS, would be translated into USD, and any gain or loss would be reflected as an accumulated translation adjustment (ATA) flowing directly to shareholders' equity.

Hedging the Peso Exposure

This time, Michel had sent some materials along with the policy deviation proposal. She reviewed the market for forwards and options on the ARS and suggested a method for thinking about how costly it would be to hedge the ARS exposure in the financial markets. Michel had 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. With the peso pegged at 1 : 1 to the dollar, the forward premium, approximately 4.56% on a one-month contract, would be lost if the peso peg was maintained (since pesos could instead still have been purchased at 1 : 1). Michel extrapolated from the historical prices 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 what alternative hedging opportunities might be available to mitigate the impact of a likely devaluation. He 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. Similarly, creating exports—even if to other GM affiliates—from Argentina could bring in revenues in more stable foreign currencies. GM Argentina had already eliminated peso cash balances and transferred them in USD to the European Regional Treasury Center. It was also considering the purchase of some materials locally in ARS for export to other entities in the region that would pay for them in hard currency. GM-Argentina's USD borrowings would certainly have to be addressed. The Argentina situation was more complex than most currency deviation requests—although Feldstein had to consider all of the same issues as with the CAD deviation, it was less clear how to accomplish an ARS deviation effectively.

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?

Understanding Competitive Exposures

Source of Competitive Exposure

All this thought devoted to changing a fundamental business process to minimize exposures readied Feldstein for tackling the final proposal—the Japanese yen. This exposure was not created by GM's inflows or outflows or how it chose to run its business. Rather, it was a result of competing against companies with different home currencies. The major Japanese automakers had large portions of their cost structure denominated in yen. As a result, any depreciation in the yen lowered their relative cost structure as compared to the U.S. and European auto manufacturers. If some of GM's competitors achieved significantly reduced costs through currency depreciations, this meant that the performance of GM's business faced currency risk: lower costs for Japanese firms would lead to lower required prices to achieve the normal profitability levels, thus eroding GM's market share—and market value.

The dollar/yen exchange rate had fluctuated widely over the past two decades and was again depreciating (see Exhibit 14). Japanese automakers derived 56% and 43% of their revenues from the U.S. market in 1999 and 2000, respectively. In the most recent year, they sold 4.1 million units in the United States. Equity analysts had estimated that the yen appreciation from 117 to 107 during the first half of 2000 had reduced Japanese automakers' combined global operating profits by \$4 billion. Feldstein reversed that statistic in his mind: for every 1 yen depreciation against the dollar, Japanese

competitors' collective operating profit grew by more than \$400 million. Rough estimates from research reports suggested that the Japanese firms were unprofitable when the yen was stronger than 110 to the dollar and profitable at 120 or more yen to the dollar.

Measuring Competitive Exposures

Feldstein thought of this exposure as a competitive one rather than a financial one. There was no projected receivable or payable and no capital investment or loan to be repaid, yet there was still a bottom-line impact that stemmed from fluctuations in exchange rates. Because of the lack of an explicit transaction, Feldstein realized he was outside the usual territory of GM's hedging policy. Any action with respect to the yen based on this perceived competitive exposure would be setting a new precedent—something Feldstein felt he had to consider very carefully. At the very least, he needed an airtight story justifying the magnitude of the exposure and how it could be effectively hedged.

Feldstein felt that a compelling case could be made for the following chain of events. (1) A depreciation in the yen lead to (2) additional gross margin for Japanese automakers, who (3) passed along some of this benefit to consumers in the form of lower prices, and (4) as a result of lower prices the Japanese automakers gained market share in the U.S., which (5) ate into unit sales at GM, which (6) lowered GM's profits, which (7) reduced GM's market value. The key was numerically estimating these variables and effects.

Of course, he would also need to place his estimated competitive exposure in the context of GM's overall yen exposure. This included a commercial exposure based on forecasted receivables and payables of \$900 million, an investment exposure resulting from equity stakes in several Japanese companies (see Exhibit 15), and a financing exposure through a yen-denominated loan. GM had recently completed a yen bond issue, one of the objectives of which had been to partially offset the yen competitive exposure. Approximately \$500 million worth of bonds were outstanding.

Feldstein realized that estimating the magnitude of the competitive exposure depended on a number of assumptions and involved a fair amount of guesswork. In any event, he could calculate sensitivities for each input variable later. After consultations with the business development team, he figured that the average Japanese car had between 20% and 40% Japanese content. This included parts sourced from suppliers in Japan as well as labor and plant expense incurred in Japan. A yen depreciation, therefore, had the potential to reduce cost of goods sold substantially. Hoping for insights into what portion of cost savings might ultimately be passed on to end buyers, Feldstein conferred with colleagues of his in GM's sales and marketing organizations. The feedback he received suggested that a reasonable estimate of what the Japanese automakers might give away in terms of added incentives or lower sticker prices would be between 15% and 45% of the cost savings. In 2000, Japanese automakers had given away relatively little in incentives in comparison to the rest of the industry (see Exhibit 16). GM, on the other hand, had given away more than the industry average—and almost one third of per vehicle profits.

The two most difficult factors to estimate were the consumer sales elasticity and the cross elasticity to GM sales. Feldstein consulted with one of sales managers for dealer networks and was told that a 5% price increase could be expected to lower unit sales by around 10%. In an effort to isolate the impact on GM, Feldstein assumed that any market share losses to Japanese automakers would be shared equally among and entirely by the Big Three in Detroit.

Feldstein figured that a rough calculation around a 20% yen devaluation would capture an upper bound of the likely exposure. The consequent annual impact on GM's income statement could then

be valued as a perpetuity at a 20% discount rate—clearly a simplification, but if he needed more detailed figures he could ask his team to delve deeper into the numbers.

A Place for Competitive Exposures in GM's Corporate Hedging Policy?

Unlike the CAD and ARS deviations, the yen exposure was simply more difficult to measure. Feldstein was going to have to make a case for considering nominal exposures of a type not usually contemplated by the FX hedging policy. In the context of a passive policy, implementing too many deviations might create a *de facto* active policy. Feldstein was hesitant to broaden the scope of hedgeable exposures without carefully assessing the consequences. What about the German car makers? Should euro exposures be measured too? Either way, the first step was getting a handle on the magnitude of the yen exposure.

Conclusion

Feldstein had a great deal of thinking to do. None of the three cases—the CAD deviation, the ARS deviation, or the JPY deviation—was a simple one. He was being asked to sign off on some very significant exposures, some in ways not necessarily contemplated by GM's hedging policy. 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.

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 their 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 were given.

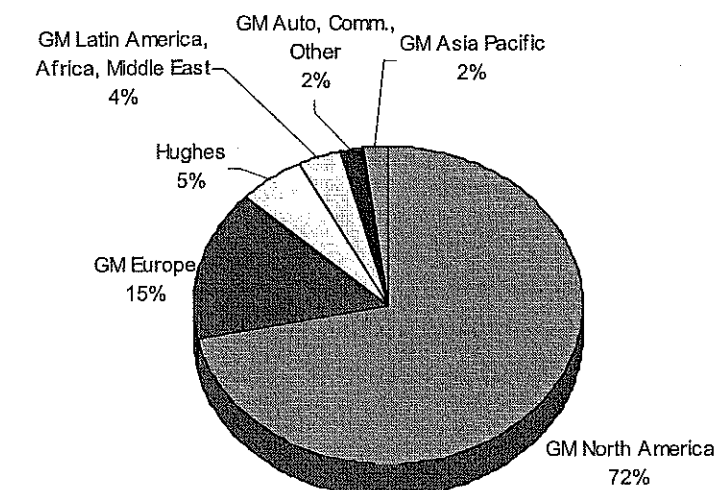
What is a "delta exchange?" Mechanically, by agreeing to the delta exchange, GM is agreeing to act as the counterparty for the bank's delta hedging transaction at the spot rate prevailing when the option price quotation was given. This protects the bank's ability to hedge the option exposure. It also 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.

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

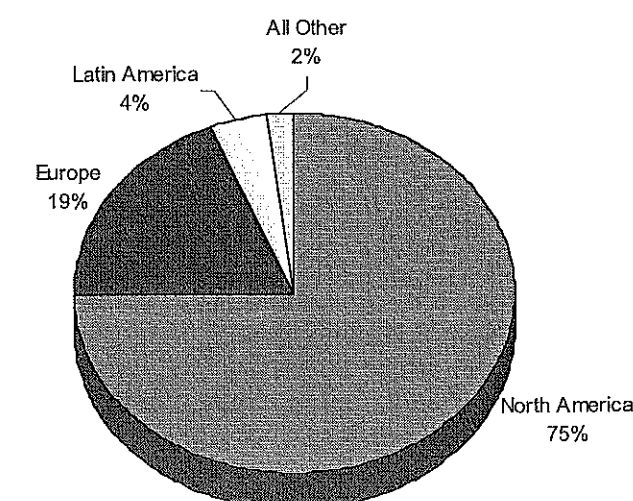
Source: General Motors, December 31, 2000 10-K (Detroit: General Motors, 2001).

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



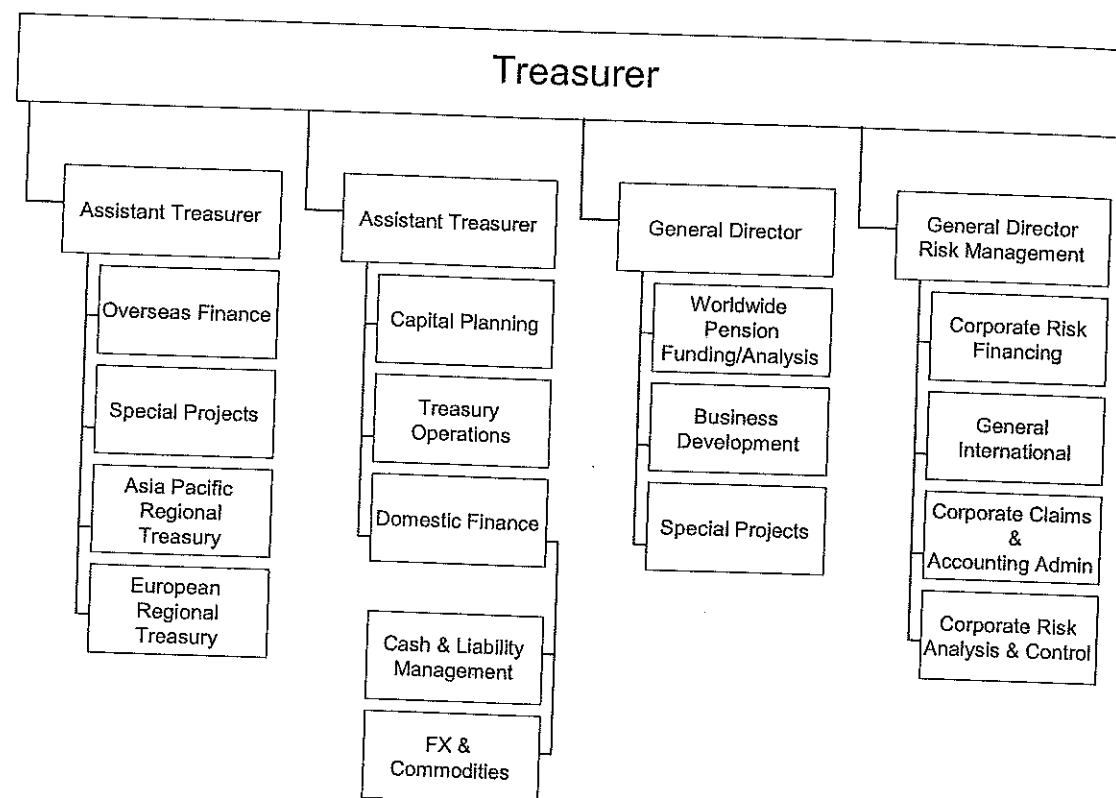
Source: General Motors, 2001 Annual Report (Detroit: General Motors, 2002).

Exhibit 3 GM Geographic Breakdown of Net Property, 2000



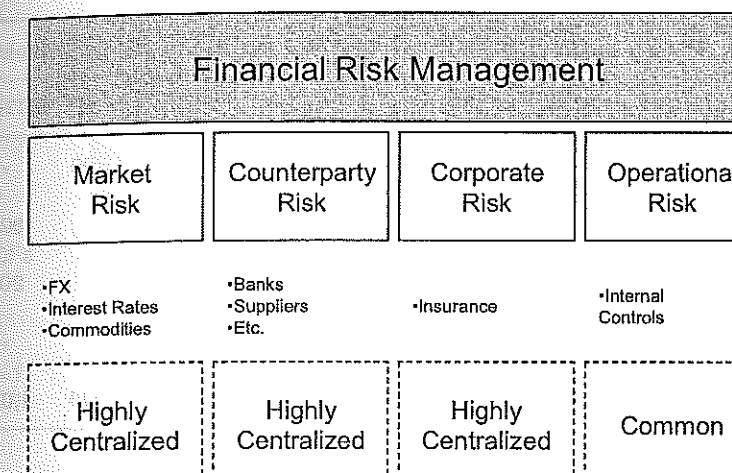
Source: General Motors, 2001 Annual Report (Detroit: General Motors, 2002).

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 (\$000)	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
t=0 CFs	FORWARDS						OPTIONS					
	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 Illustrative Example of the Effect of a EUR Depreciation / USD Appreciation Depending on the Choice of Functional Currency

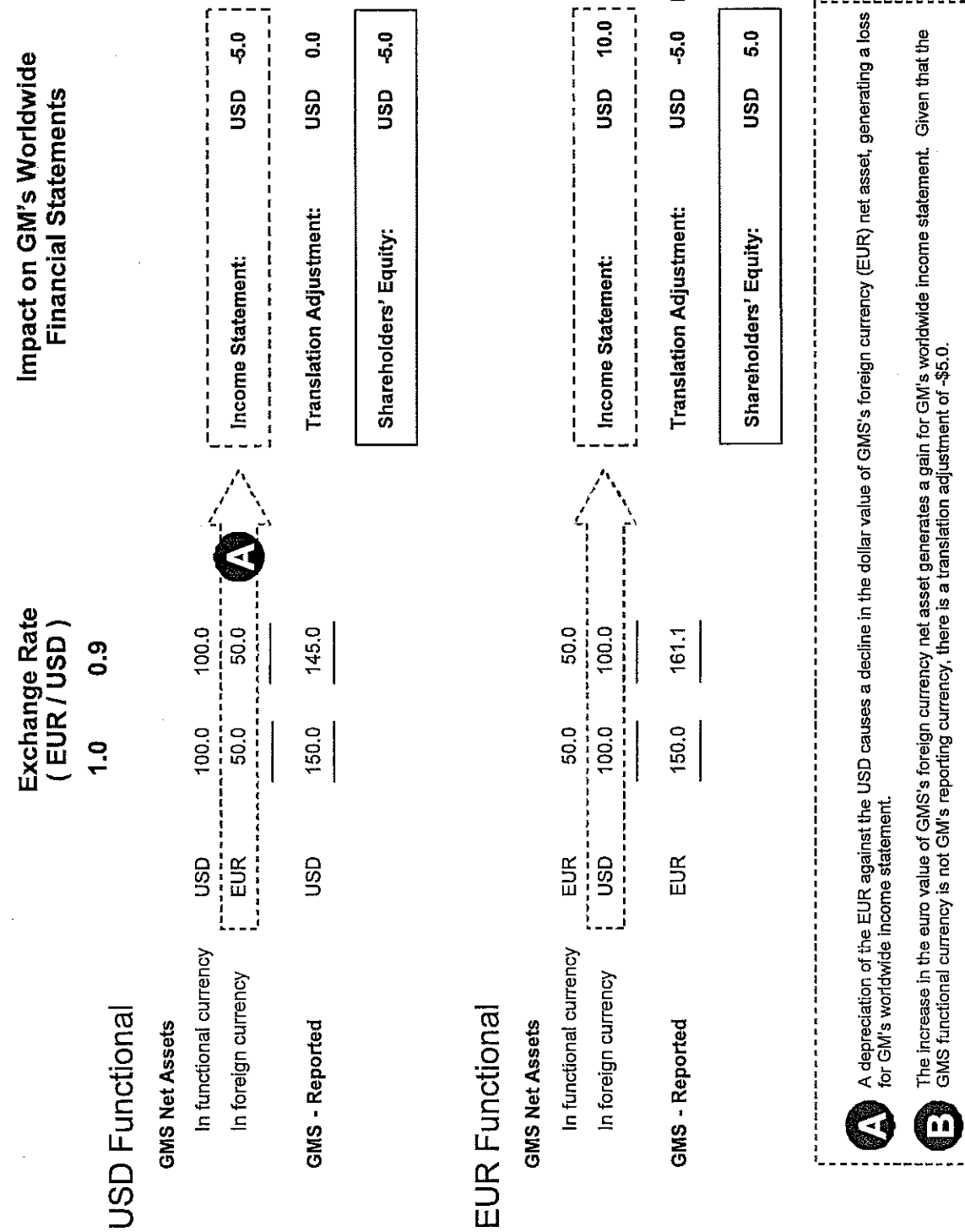


Exhibit 9 GM Canada – Projected Cash Flow Exposure

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

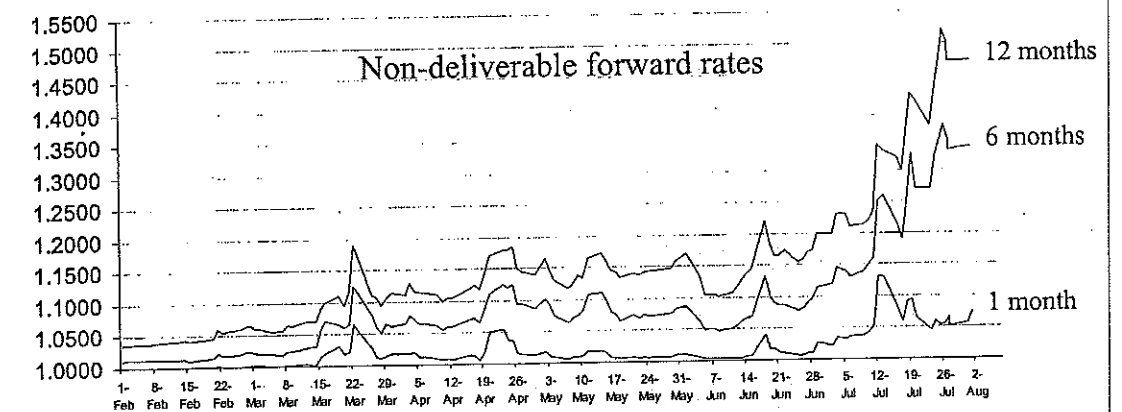
ARS Monetary Assets		ARS Monetary Liabilities	
Scrap incentive owed by govt.	45.8	Payables to local suppliers	24.1
Interest subsidy owed by govt.	3.2	Provisions to local suppliers	11.3
VAT credit and other tax owed by govt.	130.6	ARS loan (VAT financing)	13.7
Receivable (tax credit reimbursement)	2.7	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.

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



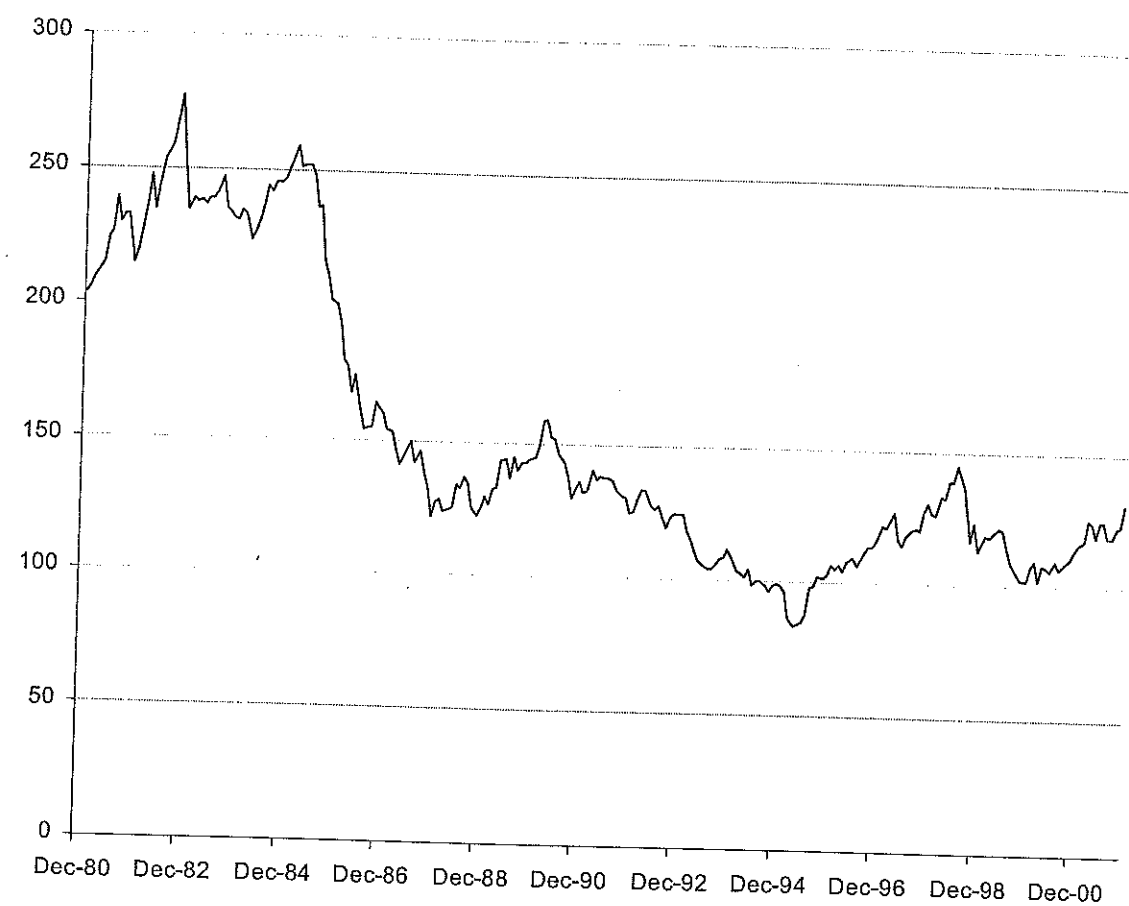
Source: Company documents.

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.

Exhibit 14 Historical Japanese Yen/U.S. Dollar Exchange Rate (Yen per Dollar)



Source: Thomson Financial Datastream.

Exhibit 15 General Motors Investments in Japanese Automakers

Affiliate	Affiliate Exposure Long/(Short) (\$ billions)	GM Ownership Stake
Fuji	(1.50)	20%
Isuzu	(1.02)	49%
Suzuki	(0.09)	20%

Source: General Motors

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

Note: Exposures are net yen exposures (measured in dollars) and are presented for each affiliate entity. For example, Fuji's yen-denominated liabilities exceed its yen-denominated assets by \$1.5 billion. GM's exposure is limited by the relevant ownership share in the affiliate.

Foreign Exchange Hedging Strategies at General Motors

t in the United States

