ACCOUNTING VERSUS ECONOMIC EXPOSURE TO CURRENCY RISK

Thomas J. O'Brien
is a business professor at the University of Connecticut in Storrs.

Accounting rules for measuring the effects of exchange rate changes involve both 1) foreign exchange transactions, and 2) translation of foreign financial statements. The impact of exchange rate changes on a firm's financial statements, referred to as "accounting exposure," differs in some cases from the impact on anticipated cash flows and firm value, referred to as "economic exposure." Understanding when and why the differences occur is important in interpreting financial statement disclosures in this area.

Finance theory suggests that investors can measure economic exposure and understand when the effects of accounting rules do not capture the economic reality; that is, when accounting exposure differs from economic exposure. There is some question, however, about whether actual investors understand economic exposure, let alone see through the accounting exposure.

Bartov and Bodnar [1994], for example, maintain that understanding the complex relation between firm value and exchange rates is difficult for investors, who thus must rely on financial statements. Hu [1996] reports that investors interviewed not only do not understand the techniques used by firms to manage economic exposure, but also are confused by the reporting rules that are used to measure and report accounting exposure.

To help provide analysts and investors a better understanding, this article employs three settings to illustrate the differences between accounting and economic exposure to exchange rate changes: 1) a purely domestic company that manages its economic exposure with either debt denominated in a foreign currency or positions in currency derivatives; 2) an exporter that similarly manages economic exposure; and 3) a multinational company that has assets in a foreign country, and that also manages currency exposure with foreign currency debt or derivatives. For simplicity, the basic issues are covered first with illustrations that assume all exchange rate movements are "permanent." The distinction between "permanent" and "transitory" components of exchange rate movements and its implications are discussed later.

ECONOMIC EXPOSURE, CURRENT EARNINGS, AND FOREIGN CURRENCY TRANSACTIONS

Consider first PDC Co., whose home country is the United States, and whose assets and sales are entirely in the U.S. and denominated in U.S. dollars. Although purely domestic in its operations, the company's revenues are assumed to be sensitive to changes in the U.S. dollar/British pound exchange rate, because British competitors have enough price-setting clout to make U.S. prices partially adjust to exchange rate changes. Herz [1994] portrays this scenario with Japanese television makers. Pringle [1995] discusses competitive exposure in more detail.

Assume that currently PDC Co. expects a stream of future operating cash flows of $1 million per year into perpetuity, as long as the exchange rate does not change. Also assume that PDC Co.'s cost of capital is 10%, and thus that the total economic value of the company is currently $1,000,000/0.10 = $10,000,000.

Assume further that PDC Co.'s economic exposure to the British pound is linear and measured by an elasticity (percentage sensitivity) of 0.60. This sensitivity means that, other things equal, if the

pound depreciates (appreciates) by 10%, PDC Co.'s expected operating cash flow stream would drop (rise) by 6% to $940,000 ($1,060,000), and thus the economic value of the firm would drop (rise) to $9,400,000 ($10,600,000). O'Brien [1994] discusses the interpretation and measurement of currency exposure by percentage change sensitivity.

Foreign Currency Debt

Assume that PDC Co. has $6 million worth of sterling-denominated debt outstanding. Assuming that the sterling value of the sterling-denominated debt does not change, the U.S. dollar value of the sterling-denominated debt will drop (rise) by 10%, to $5,400,000 ($6,600,000) if the pound depreciates (appreciates) by 10%. Since the change in U.S. dollar value of the debt offsets the change in the economic value of the firm, the economic value of PDC Co.'s equity is $4 million before and after any change in the value of the pound.

Consider, however, the change in PDC Co.'s *reported (book)* equity if the pound changes by 10%. There will be no change in the reported value of PDC Co.'s *assets*, but since the sterling-denominated debt is a foreign currency transaction, the U.S. dollar value of the debt must be adjusted on the balance sheet using the new exchange rate. Thus the sterling-denominated debt will be reported at the new U.S. dollar value of $5,400,000 ($6,600,000).

The $600,000 (non-cash) change in the U.S. dollar value of the sterling-denominated debt is required to flow through the current income statement. Since PDC Co. is using sterling-denominated debt to hedge *anticipated* future revenues, the change on the debt position must be reported in current income and not deferred.

Gains/losses on hedging transactions can be large in comparison to a company's operating cash flow, so the reported earnings for PDC Co. will appear volatile in the face of exchange rate fluctuations. Earnings will be high when the pound depreciates, and vice versa, exactly the *opposite* direction of the company's natural unhedged economic exposure.

The change in the value of the sterling-denominated debt is reported (after taxes, which are ignored here for simplicity) as a change in retained earnings, part of shareholders' equity. Thus, if the pound depreciates by 10%, the *reported* equity for PDC Co. would be $600,000 higher, even though the *economic* value of the equity is hedged and does not change. PDC Co.'s reported (book) equity value changes, because the reported financial statements reflect the exposure of the hedging vehicle (the sterling-denominated debt), but not the economic exposure of the company's future operating cash flows. Again, the distortion is in the opposite direction of the company's natural exposure.

Derivatives

In many situations, management wishes to hedge economic exposure but avoid the resulting accounting exposure. Currency swaps and forward exchange contracts are of no help in this regard. SFAS No. 52 [1981] requires that these hedging vehicles be marked to market for reporting purposes, just like foreign currency debt. In fact, the scenario above would have the same features had the hedging been accomplished with "synthetic" sterling-denominated debt, created from U.S. dollar debt combined with a dollar-pound currency swap or a strip of dollar-pound forward exchange contracts.

Suppose that instead of actual sterling-denominated debt, PDC Co. employed $6 million of U.S. dollar debt combined with an at-market position in a fixed-for-fixed currency swap to pay pounds (and receive dollars), with a notional principal of $6 million. If the pound depreciates by 10%, assuming that interest rates do not change, the new present value in dollars of the stream of swap payments that PDC Co. owes in pounds is 10% less than $6 million, or $5,400,000. Since the present value of its future receipts of dollar flows from the swap is still $6 million, the mark-to-market value of the currency swap to PDC Co. is $6,000,000 – $5,400,000, or $600,000. This amount is an economic gain to PDC Co. that hedges the natural economic exposure of the anticipated cash flow stream, just like actual sterling-denominated debt.

But mark-to-market gains/losses on the synthetic sterling-denominated debt position are also required to be reported on the firm's current income statement and will affect the firm's retained earnings, just as if actual sterling-denominated debt were used. With the currency swap, there is no direct charge to

the debt account, since the debt is actually denominated in the base currency. The $600,000 gain on the swap, however, is recorded as an offset to the debt, and shareholders' equity is increased by $600,000 (again, ignoring taxes).

Thus, if PDC Co. had tried to hedge economic operating exposure by a short position on pounds in a currency swap, the reported earnings and the book equity on the reported balance sheet would show exactly the same amounts as if actual foreign currency debt were used. Similar results can be demonstrated by creating synthetic foreign currency debt via a strip of forward exchange positions.

Although using options to hedge *linear* economic exposure is more complex than using forwards and swaps, options have been used anyway, because for some time mark-to-market reporting rules were silent on options, allowing their use without the requirement to report unrealized mark-to-market gains/losses in current earnings. In 1992, however, the Securities and Exchange Commission ruled that gains and losses on options should be marked to market, ending the use of complex option strategies to hedge linear economic exposure while avoiding accounting exposure.[1]

Another approach to the accounting exposure problem has been currency-indexed debt. Currency-indexed debt is technically (in the "legal" sense) denominated in base currency, but interest payments are indexed on an exchange rate. In 1992, in the wake of the SEC's option ruling, Disney Co. issued "dollar-denominated" notes whose coupon payments were indexed on exchange rates. The purpose was to hedge the portion of the anticipated future operating revenue stream that was denominated in foreign currencies, but to account for the currency-indexed debt as U.S. dollar debt. Disney avoided the technical equivalence with a foreign currency note by not indexing the principal, but the index factor for the coupon payments was geared so that the instrument would gain or lose U.S. dollar economic value in a manner similar to actual foreign currency debt.

Although "synthetic instrument accounting" is only in the development stage (see Herz [1994]), the philosophy maintains that if a currency-indexed note is economically the same as actual foreign currency debt, it should be accounted for as foreign currency debt. Because of the way the Disney notes are structured, whether or not they represent synthetic foreign currency debt is open to interpretation.

EXPORTERS AND FOREIGN CURRENCY RECEIVABLES

Exporters have a generally similar exposure problem to that described for PDC Co., except that exporters also have foreign currency receivables. Exporters often hedge receivables into their home currency with forward exchange positions, eliminating the uncertainty of a receivable's base currency value, but they still have the economic exposure of anticipated future revenues, just as PDC Co. above.

Suppose an exporter hedges the economic exposure of its anticipated future revenues with foreign currency debt, but does *not* hedge the receivables with short-term forward exchange positions. Then the accounting for the effect of exchange rate changes on the receivables will result in gains and losses that show on the current income statement and will offset some of the mark-to-market gains and losses on the foreign currency debt. In this approach, the exporter accepts the near-term cash flow uncertainty of unhedged receivables as a means to reduce the accounting distortion created by hedging the long-term economic exposure with foreign currency debt.

Consider a U.S. exporter, UEX Co., that ships all its product to England. For simplicity, assume that all the firm's sales are to English customers, and are denominated in pounds, but that UEX Co. has no overseas subsidiary. Assume that UEX Co. has enough price-setting clout to be able to adjust the pound prices of its products for 80% of exchange rate movements. In other words, if the pound depreciates by 10%, UEX Co. can increase its pound prices by 8% to offset most of the change in dollar revenues that would have resulted from the depreciation of the pound. (For a real-world example of such adjustments, see Pringle's [1991] discussion of Dow Chemical Company.)

Thus UEX Co.'s operating revenue exposure to the pound is 0.20, meaning that if the pound changes by 10%, UEX's expected dollar revenue stream changes in the same direction by 2%. Assume that all UEX Co.'s operating costs are incurred in the U.S., are denominat-

ed in U.S. dollars, and are not sensitive to changes in the dollar/pound exchange rate. Assume further that expected operating costs are two-thirds of revenues, and thus that the expected operating margin is one-third. Then a 2% change in *revenues* results in a 6% change in operating *cash flows*.[2] Thus, like PDC Co., but for different economic reasons, UEX Co. has an economic value exposure of 0.60 to the British pound.

Like PDC Co., UEX Co. could hedge its long-term economic exposure by using sterling-denominated debt in its capital structure, in the amount of 60% of the total economic value of the firm. With such hedging, the economic value of UEX Co.'s equity would not fluctuate with exchange rate changes, because changes in the value of the debt offset changes in the economic value of the firm.

For example, assume that the economic value of UEX Co. is $10 million, and that $6 million in sterling-denominated debt is used to hedge its economic exposure of 0.60. A 10% depreciation in the value of the pound will cause the present value of the anticipated future revenues to fall by 6% ($600,000) and the value of the sterling-denominated debt to fall by 10% ($600,000). Thus UEX Co's economic exposure is hedged by the sterling-denominated debt.

Unlike PDC Co., however, UEX Co. has foreign currency receivables. Assuming that UEX does not hedge its receivables with short-term forward exchange contracts, UEX Co. is in a better position vis-à-vis accounting exposure than PDC Co., because the accounting gains and losses on the sterling debt would be at least partly offset by the accounting gains and losses on UEX Co.'s receivables balance.

For example, assume that the receivables balance represents 25% of the total economic value of the company, and thus that UEX Co. has a receivables balance of $2.5 million prior to the exchange rate change. With a 10% depreciation of the pound, there is a loss of $250,000 on the receivables that partially offsets the $600,000 loss on the sterling-denominated debt on the income statement. UEX Co. has less accounting exposure than PDC Co., even though the two companies have used the same amount of sterling-denominated debt to hedge the same long-term economic exposure. Of course, UEX Co. has some short-term cash flow exposure that it would not have if it hedges the receivables with forward exchange contracts.

Since the long-term economic exposure of both PDC Co. and UEX Co. is in *anticipated* cash flows, neither PDC Co. nor UEX Co. can defer the gains or losses on hedging vehicles until the income generated by the hedged assets is realized. The hedge accounting provision in SFAS No. 52 applies only to future income that is a "firm commitment"(Herz [1994]).

While this rule impedes firms like PDC Co. and UEX Co. from managing economic exposure, regulators are concerned that more liberal rules would open the door to speculation. The concern is well founded, as a number of companies have found their treasury groups trying to become profit centers via speculation in the currency markets — sometimes with disastrous and well-publicized results for the firms and their investors (Allied-Lyons, Dell Computers, and Kashima Oil, among others).

FOREIGN SUBSIDIARIES AND TRANSLATION EXPOSURE

The discussion of these two companies should be helpful in understanding the accounting and economic exposures for a multinational company with overseas subsidiaries. SFAS No. 52 requires that a multinational parent choose a *functional currency* for an overseas subsidiary. For many subsidiaries, the functional currency is the currency of the country in which the subsidiary operates. In this case, the parent's investment in the subsidiary is carried on the subsidiary's books at historical cost, and denominated in the foreign currency. Then, in each accounting period, the subsidiary's balance sheet and income statement items are consolidated into the parent's, which is accomplished by translating the book value items at the *current* exchange rate.

The fluctuations in the parent's book values of the subsidiary's assets, liabilities, and net worth create an accounting exposure for the parent's consolidated financial statements that is called *translation exposure*.[3] Translation exposure is proportional to the percent change in the foreign currency. That is, if the functional currency of a foreign subsidiary appreciates by 20% relative to the parent's currency, the book value of a parent's holdings of the subsidiary increases by 20%.

Prior to 1981, under SFAS No. 8 [1975], firms were required to report accounting gains and losses on

investments in foreign subsidiaries according to a somewhat more complex method that also forced a significant amount of the translation gains or losses to be reported as income. The situation under SFAS No. 8 made reported earnings extremely volatile for many firms with foreign subsidiaries. Management objected to the interpretation of such changes in value as current income, and to the highly volatile earning reports.

These objections led to the replacement of SFAS No. 8 with SFAS No. 52, under which translation gains or losses are *not* considered current earnings, but are instead taken directly to the equity section of the balance sheet. Moreover, SFAS No. 52 permits the gains or losses on liabilities that directly offset the *book value* of a parent's holding of a foreign subsidiary not to be included as current earnings and to directly offset the asset translation changes in the parent's shareholders' equity. Thus the gains or losses on hedging vehicles, like foreign currency debt and derivatives, avoid any accounting exposure of the type we have discussed, as long as the value of the hedging vehicle is less than or equal to the *book value* of the foreign asset.[4]

Translation adjustments are intended to reflect the impact of exchange rate changes on the base currency economic value of foreign assets, but translation exposure is often *not* equal to the corresponding economic exposure, as demonstrated in two scenarios below. In the first, the overseas subsidiary poses a currency conversion exposure to the parent, but the subsidiary's economic value does not equal its book value. In the second, the subsidiary's book and economic values are the same, but the subsidiary's economic sensitivity to exchange rates is different from that of the translation rules.

Unequal Economic Values and Book Values

Consider a U.S. parent, MUL Co., that has just organized an investment in a German subsidiary, GMK Co. Assume that the total book value of GMK Co. is DM 6 million, and that the investment has a positive net present value (NPV) of DM 3 million. Assume that DM 2 million is borrowed by the subsidiary from creditors and that the MUL Co. supplies the other DM 4 million. The latter amount is viewed as GMK Co.'s (book) equity and as the book value of a net foreign currency asset of the parent, MUL Co. The book value of MUL Co.'s investment in GMK Co. is equivalent to $2 million, given an assumed exchange rate of 2.00 DM/$. Since the NPV of GMK Co. is DM 3 million, the total economic value of GMK Co. is DM 9 million ($4.5 million), and the economic value of GMK Co.'s equity is DM 7 million ($3.5 million).

Regardless of the *economic* exposure posed by the subsidiary to the parent, if the mark depreciates to 2.50 DM/$ (= 0.40 $/DM), the parent reports a value for its GMK Co. subsidiary of $1,600,000 (0.40 $/DM) (DM 4,000,000). The 20% drop in the book value of MUL Co.'s holdings in GMK Co. is a translation exposure, exactly the same percentage drop as in the value of the foreign currency. The $400,000 decline in the U.S. dollar book value of the foreign asset results in a $400,000 decline in the book value of MUL Co.'s shareholders' equity.

Assume that MUL Co.'s economic exposure of the subsidiary is 1.0; that is, that when the mark depreciates by 20%, the economic value of the subsidiary in marks does not change, and thus in U.S. dollars the economic value of the subsidiary drops by 20%. In this case, the accounting translation adjustment correctly reflects the *percentage* change in the U.S. dollar economic value of the foreign asset, but not the total change, because economic value is not equal to book value. In U.S. dollars, the economic value of MUL Co.'s foreign asset would drop from $3.5 million to $2.8 million, and the economic value of MUL Co.'s equity thus would drop by $700,000.

Now suppose that MUL Co. wants to hedge the economic exposure of the foreign asset. Since the book value of the asset is not equal to the economic value, the parent would not be able to hedge all the economic value without some distortions in reported financial statements of the type covered previously in the cases of PDC Co. and UEX Co. Specifically, MUL Co. would be allowed to describe foreign currency debt of only $2 million, the same amount as the *book* value of its investment in the subsidiary, as a hedge of a defined exposure. The gains and losses on this $2 million portion of the mark-denominated debt would thus be allowed to bypass earnings and go directly to MUL Co.'s shareholders' equity, offsetting the translation gains and losses on the subsidiary.

If MUL Co. employs only $2 million of foreign currency debt, the economic value of the foreign asset is only partially hedged. MUL Co. actually has $3.5 million of total economic value that is subject to economic exposure, not $2 million. If MUL Co. tries to use $3.5 million in mark-denominated debt (or derivatives) to hedge the economic exposure fully, $1.5 million of the hedging vehicle does not *match* with the foreign asset's book value, and MUL Co. would have to treat the excess portion as a distinct foreign currency transaction.

Thus the mark-to-market gains or losses on this excess portion must appear on the income statement, flowing (after taxes) to MUL Co.'s shareholders' equity, just as with PDC Co. and UEX Co.

Different Economic Sensitivities and Translation Sensitivities

Consider a foreign subsidiary that poses to its parent *no* economic exposure to exchange rate changes, meaning that the subsidiary's cash flows and economic value do not fluctuate with exchange rates, when viewed from the *parent's* currency. This situation actually closely describes the case of the British subsidiary of Vulcan Materials Co., as described in Garner and Shapiro [1984]. The subsidiary sold metals whose prices adjusted almost perfectly to changes in the dollar-pound exchange rate, and since most of the subsidiary's operating costs also adjusted with the dollar-pound exchange rate, the parent had very little economic exposure to its overseas subsidiary, and no hedging of economic value was necessary.

For a parent in Vulcan's situation, however, the book value of the subsidiary is subject to translation adjustments for the full changes in the exchange rate. The translation gains or losses are not reported on the parent's current income statement, but the shareholders' equity section of the balance sheet does reflect the translation exposure. While most overseas subsidiaries pose *some* economic exposure to exchange rates for their parent, the Vulcan scenario clearly demonstrates that the magnitude of the economic value exposure can be quite different from that in the translation rules.

In a perfectly efficient financial market, the portion of translation exposure that does not reflect economic exposure is ignored by investors. Management, however, may still believe that investors are not as savvy in reality as the efficient markets hypothesis suggests. Managers may believe that they should hedge their translation exposure, whether or not it is an accurate reflection of economic exposure. For companies whose translation exposure is greater than the economic exposure, this hedging activity will actually *create* an economic exposure where none was present. Hu [1996] indicates that many companies try to manage their translation exposure.

As an example, assume that the economic exposure of a foreign subsidiary is zero, as in the Vulcan scenario. If the parent tries to hedge the *translation* gains or losses with foreign currency debt or currency derivatives, the gains or losses on the hedge positions will generate *real* gains or losses. Ironically, the (real) gains and losses on the hedging vehicles would *not* have to be reported on the income statement, since the positions offset book values of foreign assets and thus qualify for "hedge accounting" treatment under SFAS No. 52.

If a parent's economic exposure to a foreign subsidiary is positive but less than the translation exposure, there will generally be some accounting distortion from the hedging of economic value. If the book value of the foreign asset is sufficiently large, the distortion will be excess translation exposure. If the book value of the foreign asset is not large enough, the distortion will be from the unmatched portion of the hedging position.

To understand this point more clearly, assume that MUL Co. has another German subsidiary, OSB Co., which has an economic value exposure of 0.40, suggesting that the subsidiary's economic value in U.S. dollars drops by 4% when the subsidiary's currency depreciates by 10%. MUL Co. could establish an economic hedge by using foreign currency debt in the amount of 40% of the total economic value of its net holdings of OSB Co. As long as the book value of MUL Co.'s investment into OSB Co. is not less than 40% of the economic value, MUL Co. can issue the appropriate level of foreign currency debt to hedge the economic exposure, and still have that amount match the asset *book* value and thus be considered a hedge for accounting purposes. Unfortunately, any excess of foreign asset book value over the debt value is subject to translation exposure in the parent's

reported shareholders' equity, even though the economic exposure of owning the foreign asset is hedged.

For example, assume that the economic value of MUL Co.'s holdings of OSB Co. is $10 million, that the book value is $6 million, and that the parent has $4 million in foreign currency debt issued to hedge the economic exposure sensitivity of 0.40. The gains and losses from exchange rate changes for the amount of *unhedged book value*, which is $6,000,000 – $4,000,000 = $2,000,000, will have to be reflected in MUL Co.'s shareholders' equity. These gains and losses are a translation adjustment that bypasses the income statement.

Had the book value of the subsidiary been only $3 million, instead of $6 million, using $4 million in foreign currency debt would still have hedged the economic exposure, but the unmatched portion of the foreign currency debt over the book value of the investment is $4,000,000 – $3,000,000, or $1,000,000. As before, the gains or losses on this unmatched portion would have to be reported in current earnings, and then go to the parent's shareholders' equity. The other $3 million in debt is regarded as a hedge of the $3 million book value of the foreign currency assets. Under SFAS No. 52, the translation adjustments on both of these two $3 million amounts bypass the income statement and offset each other in MUL Co.'s shareholders' equity account.

PERMANENT AND TRANSITORY EXCHANGE RATE CHANGES

The divergence between accounting and economic exposure becomes more pronounced when changes in exchange rates have both "permanent" and "transitory" components. To understand these concepts, suppose that today's equilibrium expectation of the spot exchange rate a year from now is equal to today's spot exchange rate. Tomorrow, a "shock" causes the exchange rate to rise unexpectedly by 10%. If this change causes an upward revision of the expected spot exchange rate by 10%, then all of the 10% exchange rate change is permanent, and none is transitory.

Generally, an unexpected exchange rate movement results in a *partial* revision of expectations. For example, if the expected spot exchange rate is revised upward by 4%, given an upward shock in the spot rate of 10%, then 40% of the exchange rate movement is permanent, and 60% is transitory (noise). After the shock, the exchange rate is out of equilibrium and is expected to recover the transitory portion sometime in the future.

The portion of an exchange rate change that is permanent is also called the *persistence*. Although a long-run average persistence estimate for exchange rate changes is unknown at present, it is useful to compare the economic and accounting implications of permanent and transitory components of exchange rate changes.[5]

Consider first the scenario of a sterling-denominated bond traded in the international financial market. Assume the bond is trading at par in its own currency, and that interest rates do not change. If the pound depreciates by 10%, then the *dollar amount* that one would pay for the bond drops by 10%. But what if the 10% depreciation of the pound is entirely transitory and the exchange rate is expected to recover the depreciation prior to any coupon payments by the bond issuer? The expected future coupon and principal payments do not change, in either pounds or dollars, with the transitory exchange rate change, and the *economic value* of the bond is unchanged in both pounds and dollars.

The scenario is not an equilibrium, and until the exchange rate recovers its transitory change, the bond is undervalued if purchased with dollars, representing a quasi-arbitrage for investors with dollars, who will use dollars to buy pounds to buy the bonds. In principle, this activity will end the misvaluation, but how long would it take in reality for this to happen?

As Shleifer and Vishny [1997] point out, there are limits to arbitrage, and in reality "investors with dollars" do not have infinite capital with which to exploit this quasi-arbitrage situation. As long as the misvaluation prevails, the "price" of the bond in dollars is lower than the economic value of the bond in dollars.

In the examples of PDC Co. and UEX Co., the entire exchange rate change was assumed to be permanent, and thus a 10% depreciation of the foreign currency resulted in a 6% decline in the economic value of the firm (from $10 million to $9.4 million) and a 10% decline in the value of the ster-

ling-denominated debt (from $6 million to $5.4 million). If only part of an exchange rate change is permanent, the economic value of the firm and the sterling-denominated debt would adjust only to the permanent portion of the exchange rate change, but the same amount of foreign currency debt ($6 million) will hedge the economic exposure.

For example, if only 20% of the exchange rate move is permanent (and 80% is transitory), the economic value of the firm would fall by only 0.60 (0.20) (10%), or 1.2%, while the debt would drop in value by (0.20) (10%), or 2%. Thus, the economic value of the firm would drop by $120,000, as would the value of the sterling-denominated debt, and the economic value would still be hedged by $6 million worth of sterling debt.

Regardless of the *economic* changes in the value of the firm and its debt, the *reported* value of the debt will change by the same percentage as the *full change* in the exchange rate, as will the translation of the book value of foreign subsidiaries. For example, if all of a 10% depreciation of the pound is transitory, neither the *economic* value of PDC Co. or UEX Co. nor the economic value of its sterling-denominated debt would change, but the debt would be *accounted for* at the "transitory" current exchange rate.

Thus, if exchange rate changes are partly transitory, the mark-to-market accounting exposure is even more of a distortion than portrayed in the examples discussed. Similarly, the accounting for translation gains and losses at current exchange rates that may be partly transitory implies even greater distortion between book values and economic values for multinationals.

CONCLUDING REMARKS

An analyst who uses financial statements to help assess a firm's economic value and risk should be aware of the potential divergence between the economic and the accounting effects of exchange rate movements. In general, a firm's accounting exposure does not reflect its true economic exposure, particularly if the firm is managing its economic exposure or its accounting exposure with foreign currency debt or derivatives. By understanding the divergence between accounting and economic exposure, analysts may be better able to interpret financial statements for information about a firm's economic value, its foreign currency exposure, and its hedging policies.

ENDNOTES

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[1]Options also have a direct use in hedging *nonlinear* exposure, but until 1992 exotic options and dynamic option strategies were used to hedge linear economic exposure, while avoiding the reporting of mark-to-market gains and losses as income. The SEC ruling does not apply to "plain vanilla" puts and calls, so companies could continue to use them to hedge non-linear economic exposure without reporting mark-to-market gains and losses as income.

DeMarzo and Duffie [1995] also discuss the SEC option ruling. Herz [1994] indicates that accounting rules in the future are not likely to permit deferral of mark-to-market changes in any option values, plain vanilla or otherwise. Note that the use of options to hedge economic exposure and avoid accounting distortions is quite different from the use of options to hedge accounting exposure, discussed by Giddy and Dufey [1995].

[2]The magnification of UEX Co.'s revenue exposure is an example of operating leverage, since the operating costs are fixed relative to exchange rate changes. Additional discussion may be found in O'Brien [1994]. Magnification of revenue exposure also applies to the well-known case of Merck in Lewent and Kearney [1990]. Roughly 50% of Merck's operating revenues are from overseas, but operating costs are largely incurred in the U.S. and are therefore fixed relative to exchange rate changes, serving to lever the volatility in operating revenues.

[3]The accounting issues involving overseas subsidiaries in this section are not the only translation exposure issues. Some issues of a different nature, involving inflation and translation, are discussed by Pringle [1991].

[4]Bartov and Bodnar [1995] report that equity prices became less distorted after SFAS No. 52 replaced SFAS No. 8. This finding, of course, does *not* imply that equity prices properly reflect the economic value changes due to exchange rate movements, only curtailment of the severe distortions in equity prices due to the pre-SFAS No. 52 earnings volatility. The finding *does* imply that investors regard financial statements as a primary source of economic exposure information,

rather than as noise to be "seen through."

[5]Bartov and Bodnar [1994] point out that investors' inability to distinguish permanent versus temporary exchange rate movements leads to errors in characterizing the relation between firm values and exchange rates. Even though Adler and Dumas [1981] have discussed the idea of permanent and transitory components of exchange rates and the influence on bond values, that exchange rate movements are not pure "random walks," i.e., have both transitory and permanent components, is only a recent empirical finding. The evolution of the empirical literature in this regard resembles the stock price literature. For example, see Van de Gucht, Dekimpe, and Kwok [1996], who make it clear that although exchange rates exhibit persistence, estimating a permanent component is econometrically challenging because of the way persistence behaves in the long run versus the short run.

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