THE USES OF HYBRID DEBT IN MANAGING CORPORATE RISK

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The corporate use of hybrid debt securities—those that combine a conventional debt issue with a "derivative" such as a forward, swap, or option—increased significantly during the 1980s. And, while many of the more esoteric or tax-driven securities introduced in the last decade have disappeared, corporate hybrids now seem to be flourishing. In so doing, they are helping U.S. companies raise capital despite the restrictive financing climate of the '90s.

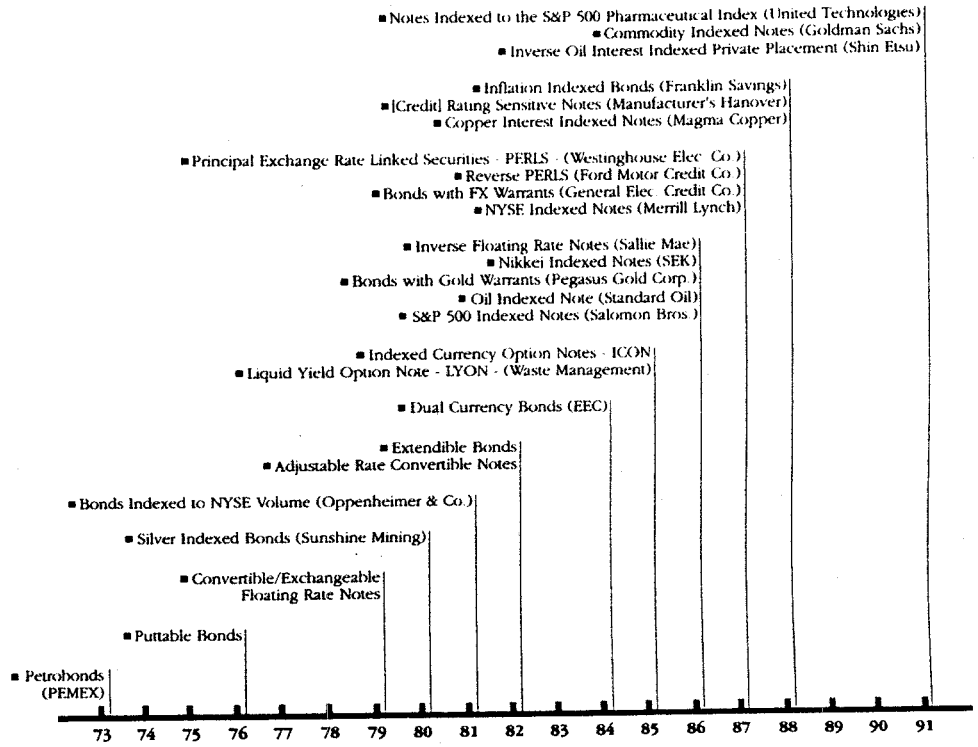
Hybrid debt, to be sure, is not a new concept. Convertible bonds, first issued by the Erie Railroad in the 1850s, are hybrid securities that combine straight debt and options on the value of the issuer's equity.[1] What is distinctive about the hybrid debt instruments of the 1980s is that their payoffs, instead of being tied to the issuing company's stock price, are linked to a growing variety of *general* economic variables. As illustrated in Figure 1, corporate hybrids have appeared that index investor returns to exchange rates, interest rates, stock market indices, and the prices of commodities such as oil, copper, and natural gas.

The recent wave of corporate hybrids began in 1973, when PEMEX, the state-owned Mexican oil producer, issued bonds that incorporated a *forward contract* on a commodity (in this case, oil). In 1980, Sunshine Mining Co. went a step further by issuing bonds incorporating a commodity *option* (on silver). In 1988, Magma Copper made yet another advance by issuing a bond giving investors a *series of commodity options* (on copper)—in effect, one for every coupon payment.

Other new hybrids, as mentioned, have had their payoffs tied to interest rates, foreign exchange rates, and the behavior of the stock market. In 1981, Oppenheimer & Co., a securities brokerage firm, issued a security whose principal repayment is indexed to the volume of trading on the New York Stock Exchange. Notes indexed to the value of equity indexes appeared in 1986, and inflation-indexed notes (tied to the CPI) were introduced in 1988.

1 The date for the introduction of convertible bonds is reported by Peter Tufano in "Financial Innovation and First-Mover Advantages," *Journal of Financial Economics*, 25, pp. 213-240

FIGURE 1 ■ DEVELOPMENT OF HYBRID SECURITIES: 1973-1991



The 1980s also saw new hybrids with payoffs that, like those of convertibles, are tied to company-specific performance. For example, the Rating Sensitive Notes issued by Manufacturer's Hanover in 1988 provide for increased payments to investors if Manny Hanny's creditworthiness declines. And the LYON™ pioneered and underwritten by Merrill Lynch in 1985 grants investors not only the option to convert the debt into equity, but also the right to "put" the security back to the firm.

The pace of hybrid innovation peaked around 1987. But hybrids are now staging a comeback. As the title of a recent *Wall Street Journal* article put it, 1991 was "A Boom Year for Newfangled Trading Vehicles."[2] The past year witnessed the introduction of notes indexed to a subset of a general equity index, Goldman Sachs' notes indexed to a commodity index, private placements incorporating options on commodities, and a boom in convertible debt.

Why do companies issue, and investors buy, such complex securities? Before the development of derivative products in the 1970s, investors may have been attracted by the prospect of purchasing a "bundle" of securities—say, debt plus warrants—that they could not duplicate themselves by purchasing both of the components separately. And this "scarce security" or "market completion" argument also holds for some of today's debt hybrids (especially those that provide longer-dated forwards and options than those available on organized exchanges).

2. December 26, 1991, p. C1. The *Journal* article dealt more with exchange-traded products than with hybrids.

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By hedging a variety of financial and operating risks and thereby increasing the expected stability of corporate cash flows, hybrids may lower the issuer's overall funding costs.

But, because active exchanges now provide low-cost futures and options with payoffs tied to all variety of interest rates, exchange rates, and commodity prices, markets are becoming increasingly "complete," if you will. Given the existence of well-functioning, low-cost markets for many of the components making up the hybrid debt instruments, we have to ask the following question: Is there any reason investors should be willing to pay more for these securities sold *in combination* rather than separately?

In this article, we argue that hybrid debt offers corporate treasurers an efficient means of managing a variety of financial and operating risks—risks that, in many cases, cannot be managed if the firm issues straight debt and then purchases derivatives. By hedging such risks and thereby increasing the expected stability of corporate cash flows, hybrids may lower the issuer's overall funding costs.[3] At the same time, though, part of the present corporate preference for managing price risks with hybrids rather than derivative products stems from current restrictions on the use of hedge accounting for derivatives, as well as tax and regulatory arbitrage opportunities afforded by hybrids.

PRICE VOLATILITY: THE NECESSARY CONDITION FOR HYBRIDS

The stability of the economic and financial environment is a key determinant of the kinds of debt instruments that dominate the marketplace. When prices are stable and predictable, investors will demand—and the capital markets will produce—relatively simple instruments.

In the late 1800s, for example, the dominant financial instrument in Great Britain was the *consol*: a bond with a fixed interest rate and no maturity—it lasted forever. Investors were content to hold infinite-lived British government bonds because British sovereign credit was good and because inflation was virtually unknown. General confidence in price level stability led to stable interest rates, which in turn dictated the use of long-lived, fixed-rate bonds.

But consider what happens to financing practices when confidence is replaced by turbulence and uncertainty. As one of us pointed out in an earlier issue of this journal, in 1863 the Confederate States of America issued a 20-year bond denominated not in Confederate dollars, but in French Francs and Pounds Sterling. To allay the concern of its overseas investors that the Confederacy would not be around to service its debt with hard currency, the issue was also convertible at the option of the holder into cotton at the rate of six pence per pound. In the parlance of today's investment banker, the Confederate States issued a *dual-currency, cotton-indexed* bond.[4]

The Breakdown of Bretton Woods and the New Era of Volatility

Throughout the 1950s and most of the 1960s, economic and price stability prevailed in the U.S., and in the developed nations generally. Investment-grade U.S. corporations responded predictably by raising capital in the form of 30-year, fixed-rate bonds (yielding around 3-4%). But, toward the end of the '60s, rates of inflation in the U.S. and U.K. began to increase. There was also considerable divergence among developed countries in monetary and fiscal policy, and thus in rates of inflation. Such pressures led inevitably to the abandonment, in 1973, of the Bretton Woods agreement to maintain relatively fixed exchanged rates. And, during the early 1970s and thereafter, the general economic environment saw higher and more volatile rates of inflation along with unprecedented volatility in exchange rates, interest rates, and commodity prices. (For evidence of such general price volatility, see Figure 2.)

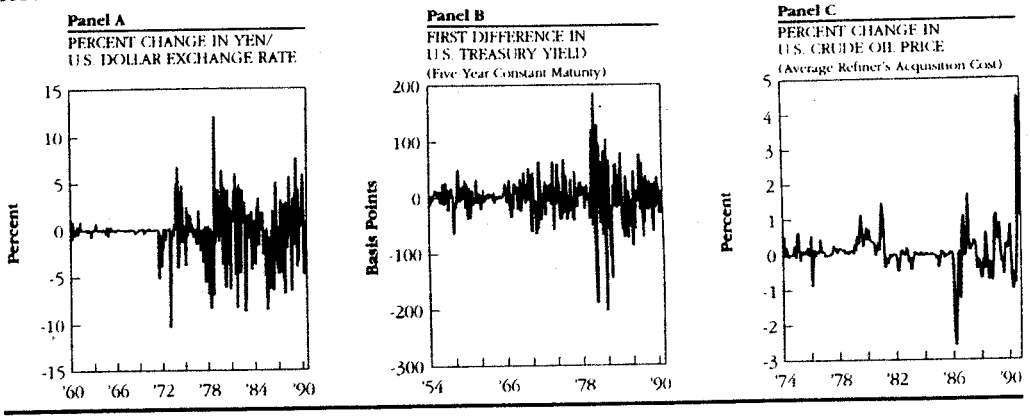
In response to this heightened price volatility, capital markets created new financial instruments to help investors and issuers manage their exposures. Indeed, the last 20 years has seen the introduction of (1) futures on foreign exchange, interest rates, metals, and oil; (2) currency, interest rate, and commodity swaps; (3) options on exchange rates, interest rates, and oil; and (4) options on the above futures and options. Flourishing markets for these products in turn helped give rise to corporate hybrid debt securities that effectively incorporate these derivative products.

3 For preliminary evidence of the impact of issuing hybrid debt on the firm's cost of capital, see Charles Smithson and Leah Schraudenbach, "Reflection of Financial Price Risk in the Firm's Share Price," Chase Manhattan Bank, 1992.

4 Wade Rawls and Charles Smithson, "The Evolution of Risk Management Products," *Journal of Applied Corporate Finance*, Vol. 1 No. 4 (1989).

In return for being granted this upside participation, bondholders will reduce the risk premium they charge. Indeed, the greater the expected volatility of the commodity price in question, the more valuable is that embedded option to the bondholders.

FIGURE 2 ■ GENERAL PRICE VOLATILITY



USING HYBRIDS TO MANAGE COMMODITY RISK

Unlike foreign exchange and interest rates, which were relatively stable until the 1970s, commodity prices have a long history of volatility. Thus, it is no surprise that hybrid securities designed to hedge commodity price risks came well before hybrids with embedded currency and interest rate derivatives.

As mentioned earlier, the Confederacy issued a debt instrument convertible into cotton in 1863. By the 1920s, commodity-linked hybrids were available in U.S. capital markets. A case in point is the gold-indexed bond issued by Irving Fisher's Rand Kardex Corporation in 1925. Similar to the PEMEX issue described earlier, the principal repayment of this gold-indexed bond was tied directly to gold prices.[5] Fisher realized that he could significantly lower his firm's funding costs by furnishing a scarce security desired by investors—in this case, a long-dated forward on gold prices. And Fisher's successful innovation was imitated by a number of other U.S. companies during the '20s.

Like so many of the financial innovations of the 1920s, however, that wave of hybrid debt financings was ended by the regulatory reaction that set in during the 1930s.[6] Specifically, the "Gold Clause" Joint Congressional Resolution of June 5, 1933 virtually eliminated indexed debt by prohibiting "a lender to require of a borrower a different quantity or number of dollars from that loaned." And it was not until October 1977, when Congress passed the Helms Amendment, that the legal basis for commodity-indexed debt was restored.

Hybrids with Option Features

The hybrids issued by Rand Kardex and PEMEX represent combinations of debt securities with forward contracts; that is, the promised principal repayments were designed to rise or fall directly with changes in the prices, respectively, of gold and oil. In the case of PEMEX, moreover, this forward-like feature reduced the risk to investors that the issuer wouldn't be able to repay principal; it did so by making the *amount* of the principal vary as directly as possible with the company's oil revenues.

Unlike the PEMEX and Rand Kardex issues, Sunshine Mining's 15-year silver-linked bond issued in 1980 combined a debt issue with a *European option*[7] on silver prices. In this case, the promised principal repayment could not fall below a certain level (the face value), but would increase proportionally with increases in the price of silver price above $20 per ounce at maturity.[8] Because most of

5. See J. Huston McCulloch, "The Ban on Indexed Bonds," *American Economic Review* 70 (December 1980), pp. 1018-21.

6. See Merton Miller's account of financial innovation in the 1920s and 1930s in the first article of this issue.

7. European options can be exercised only at maturity, as distinguished from American options, which can be exercised any time before expiration.

the commodity-linked hybrids that followed the Sunshine Mining issue in the '80s contain embedded options rather than forwards, let's consider briefly how the embedding of options within debt issues manages risk and lowers the issuer's cost of capital.

How Hybrids with Options Manage Risk. Corporate bondholders bear "downside" risk while typically being limited to a fixed interest rate as their reward. (In the jargon of options, the bondholder is "short a put" on the value of the firm's assets.) Because of this limited upside, they charge a higher "risk premium" when asked to fund companies with more volatile earnings streams. Like the forward contract embedded in the PEMEX issue, options also provide bondholders with an equity-like, "upside" participation. In return for this upside participation, bondholders will reduce the risk premium they charge. Indeed, the greater the expected volatility of the commodity price in question, the more valuable is that embedded option to the bondholders.[9]

Unlike hybrids with forwards, hybrids with embedded options provide investors with a "floor"—that is, a minimum principal repayment or set of coupons. And, though options therefore effect a less complete transfer of risk than in the case of forwards (in the sense that the firm's financing costs don't fall below the floor in the event of an extreme decline in commodity prices), investors should be willing to pay for the floor in the form of a reduced base rate of interest. To the extent they lower the rate of interest, option-like hybrids reduce the probability of default, thus reassuring bondholders and the rating agencies.

A good example of corporate risk management with options was a 1986 issue of Eurobonds with detachable gold warrants by Pegasus Gold Corporation, a Canadian gold mining firm. In effect, this issue gave investors two separable claims: (1) a straight debt issue with a series of fixed interest payments and a fixed principal repayment; and (2) European options on the price of gold. By giving bondholders a participation in the firm's gold revenues, the inclusion of such warrants reduced the coupon rate on the bond—which in turn lowered the issuer's financial risk.

Probably the most newsworthy hybrid in 1986, however, was Standard Oil's *Oil-Indexed Note*. This hybrid combines a zero-coupon bond with a European option on oil with the same maturity. The issue not only aroused the interest of the IRS, but also succeeded in rekindling regulatory concerns about the potential for "speculative abuse" built into hybrid securities.[10]

Commodity Interest-Indexed Bonds. The commodity hybrids mentioned thus far are all combinations of debt with forwards or options with a single maturity. In effect, they link only the principal repayment to commodity prices, but not the interim interest payments. But, in recent years, hybrids have also emerged that combine debt with a *series of options* of different maturities—maturities that are typically designed to correspond to the coupon dates of the underlying bond.

In 1988, for example, Magma Copper Company issued *Copper Interest-Indexed Senior Subordinated Notes*. This 10-year debenture has embedded within it 40 option positions on the price of copper—one maturing in 3 months, one in 6 months, ..., and one in 10 years. The effect of this series of embedded option positions is to make the company's quarterly interest payments vary with the prevailing price of copper, as shown below:

Average Copper Price	Indexed Interest Rate
$2.00 or above	21 %
1.80	20
1.60	19
1.40	18
1.30	17
1.20	16
1.10	15
1.00	14
0.90	13
0.80 or below	12

In 1989, Presidio Oil Company issued an oil-indexed note with a similar structure, but with the coupons linked to the price of natural gas. And, in 1991, Shin Etsu, a Japanese chemical manufacturer,

8. From the perspective of 1991, during which the silver price has averaged $4.00 per ounce, this exercise price of $20 per ounce may seem bizarre. But keep in mind that this bond was issued in early 1980. During the period October 1979-January 1980,the price of silver averaged $23 per ounce.

9. For a discussion of how the equity option embedded in convertibles could make convertible bondholders indifferent to increases in the volatility of corporate cash flow, see Michael Brennan and Eduardo Schwartz, "The Case for Convertibles," *Chase Financial Quarterly* (Fall 1981). Reprinted in *Journal of Applied Corporate Finance* (Summer 1988).

10. See James Jordan, Robert Mackay, and Eugene Moriarty, "The New Regulation of Hybrid Debt Instruments," *Journal of Applied Corporate Finance*, Vol. 2 No. 4 (Winter 1990).

issued a hybrid with a similar structure; however, the issue was a private placement and the coupon payment floated *inversely* with the price of oil.

The Case of Forest Oil:
The Consequences of Not Managing Risk

It was Forest Oil, however, and not Presidio, that first considered issuing natural gas-linked debt. But Forest's management was confident that natural gas prices would go higher in the near future and thus decided that the price of the natural gas-linked debt would turn out to be too high. Unfortunately, the company's bet on natural gas prices ended up going against them. Natural gas prices since the issue was contemplated have fallen dramatically, and the company has been squeezed between high current interest costs and reduced revenues. Indeed, the squeeze has been so tight that Forest has been forced to restructure its debt.

USING HYBRIDS TO MANAGE FOREIGN EXCHANGE RISK

As Figure 2 suggests, exchange rates became more volatile following the abandonment of the Bretton Woods agreement in 1973. As a result, many companies have experienced foreign exchange risk arising from transaction, translation, and economic exposures.

The simplest way to manage an exposure to foreign exchange risk is by using a forward foreign exchange contract. If the firm is long foreign currency, it can cover this exposure by selling forward contracts. Or if it has a short position, it can buy forwards.

Dual Currency Bonds. Similar to PEMEX's oil-indexed issue, the simplest FX hybrid debt structure is a *Dual Currency Bond*. Such a bond combines a fixed-rate, "bullet" (that is, single) repayment bond and a long-dated forward contract on foreign exchange. For example, in 1985, Philip Morris Credit issued a dual-currency bond in which coupon payments are made in Swiss Francs while principal will be repaid US Dollars.

PERLs. A variant of the dual currency structure is the *Principal Exchange Rate Linked Security*. In 1987, Westinghouse Electric Company issued *PERLs* wherein the bondholder received at maturity the principal the USD value of 70.13 million New Zealand dollars. The issuer's motive in this case was likely to reduce its funding costs by taking advantage of an unusual investor demand for long-dated currency forwards. Earlier in the same year, and presumably with similar motive, Ford Motor Credit Company issued *Reverse PERLs*. In this case, the principal repayment varied inversely with the value of the yen.[11]

Creating a Hybrid By Adding Options

As in the case of commodity-linked hybrids, forward-like FX hybrids seemed to have given way to structures containing warrants or other option-like features. In 1987, for example, General Electric Credit Corporation made a public offering made up of debt and yen-USD currency exchange warrants.

Bonds with Principal Indexed (Convertible) to FX. Like bonds with warrants, convertible bonds are made up of bonds and equity options. But there is one important difference: In the case of bonds with warrants, the bondholder can exercise the option embodied in a warrant and still keep the underlying bond. With convertibles, the holder must surrender the bond to exercise the option. Sunshine Mining's Silver-Indexed Bonds and Standard Oil's Oil Indexed Notes are similar constructions. The bondholder can receive either the value of the bond or the value of the option, but not both.

When this debt structure appeared with an embedded foreign currency option, the hybrid was called an *Indexed Currency Option Note* (or *ICON*). This security, which was first underwritten by First Boston in 1985, combines a fixed rate, bullet repayment bond and a European option on foreign exchange.[12]

USING HYBRIDS TO MANAGE INTEREST RATE RISK

Some companies have significant exposures to interest rates. Take the case of firms that supply inputs to the housing market. When interest rates rise, the revenues of such firms tend to fall. The use of standard, floating-rate bank debt in such cases would likely increase the probability of default.

11 See Michael G. Capatides, *A Guide to the Capital Markets Activities of Banks and Bank Holding Companies*, (Browne & Co.), 1988, p. 132.

12 In his article in this issue, "Securities Innovation: An Overview," John Finnerty notes that ICONs "were introduced and disappeared quickly."

Corporate hybrids reduce shareholder-bondholder conflicts by reducing current interest rates, shifting debt service payments to periods when firms are better able to pay, stabilizing cash flow, and thereby reducing the likelihood of financial distress.

Creating a Hybrid with Embedded Swaps

To manage interest rate risk, such companies may be best served by a debt instrument wherein the coupon payment actually declines when interest rates rise. Such an *Inverse Floating Rate Note*—or a *Yield-Curve Note*, as it was called when first issued by the Student Loan Marketing Association (Sallie Mae) in the public debt market in 1986—can be decomposed into a floating-rate, bullet repayment note and a plain vanilla interest rate swap for twice the principal of the loan.

Creating a Hybrid By Adding Options

Just as bondholders can be provided options to exchange their bonds for a specified amount of a commodity or foreign currency, hybrid securities have been issued that give bondholders the option to exchange a bond (typically at maturity) for another bond (typically with the same coupon and maturity).

Convertible/Exchangeable Floating Rate Notes. These hybrids, which give the holder the right to convert to (or exchange for) a fixed-rate bond at a pre-specified interest rate, first appeared in 1979. Such notes contain embedded "put" options on interest rates; that is, investors are likely to exercise their conversion or exchange rights only if interest rates fall below a certain level.

Extendible Notes. The same, moreover, is true of extendible notes, which give the holder the right to exchange the underlying bond for a bond of longer maturity. Such bonds first appeared in 1982.

USING HYBRIDS TO REDUCE CONFLICTS BETWEEN BONDHOLDERS AND SHAREHOLDERS

In "normal" circumstances—that is, when operations are profitable and the firm can comfortably meet its debt service payments and investment schedule—the interests of bondholders and shareholders are united. Both groups of investors benefit from managerial decisions that increase the total value of the firm.

In certain cases, however, corporate managements find themselves in the position of being able to increase shareholder value *at the expense of bondholders*.[13] For example, as happened in a number of leveraged recapitalizations, management could reduce the value of outstanding bonds by increasing debt or adding debt senior to that in question. (In professional circles, this is known as *event risk*; in academic parlance it is the *claims dilution problem*.) Or, if the firm were in danger of insolvency, management could choose—as did some S&L executives—to invest in ever riskier projects in desperate attempts to save the firm (the *asset substitution problem*). Finally, a management squeezed between falling revenues and high interest payments could choose to pass up value-adding projects such as R&D or, if things are bad enough, basic maintenance and safety procedures (the *underinvestment problem*).[14]

Corporate debtholders are well aware that such problems can arise, and they accordingly protect themselves by lowering the price they are willing to pay for the debt. For corporate management, such lower prices translate into higher interest payments, which in turn further raise the probability of financial trouble.

Hybrids reduce these shareholder-bondholder conflicts by reducing current interest rates, shifting debt service payments to periods when firms are better able to pay, stabilizing cash flow, and thereby reducing the likelihood of financial distress. In so doing, they also raise the price of the corporate debt to investors and lower the overall corporate cost of capital.

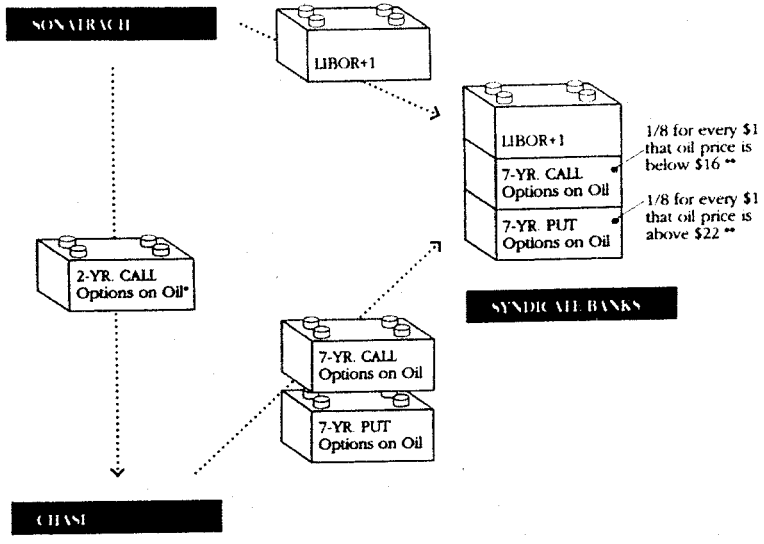
Using Hybrids to Reduce the Claims Dilution Problem (or Protect Against "Event Risk")

Puttable Bonds. Introduced in 1976, these bonds give their holders the option to "put" the bond back to the issuer. Such an option would be exercised only if interest rates rise or the issuer's credit

13 For the seminal discussion of the effect of conflicts between shareholders and debtholders (and between management and shareholders as well) on the behavior of the firm, see Michael C. Jensen and William H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure," *Journal of Financial Economics* (1976), pp. 305-360.

14 For an account of the underinvestment problem, see Stewart Myers, "The Determinants of Corporate Borrowing," *Journal of Financial Economics* (1977). For a more detailed examination of these sources of shareholder/debtholder conflict, see Clifford W. Smith and Jerold B. Warner, "On Financial Contracting: An Analysis of Bond Covenants," *Journal of Financial Economics*, 7 (1979), pp. 117-161.

FIGURE 3
OIL-LINKED CREDIT-SENSITIVE SYNDICATE



*During the first two years, if the price of oil exceeds $25, Sonatrach will pay a supplemental coupon to Chase
**In the first year, the syndicate receives additional interest if the price of oil falls outside the range of $16-$22. In year 2, the range widens to $15-$23, then to $14-$24 in year 3, and to $13-$25 in years 4 through 7

standing falls. In this sense, puttable bonds give bondholders both a call option on interest rates and an option on the credit spread of the issuer.[15] Such put options thus protect bondholders not only against increases in interest rates, but also against the possibility of losses from deteriorating operating performance or leveraged recapitalizations. In the wake of the widely publicized bondholder losses accompanying the KKR buyout of RJR Nabisco in 1989, the use of put options to protect against such "event risk" enjoyed a new vogue.

Floating Rate, Rating Sensitive Notes. These notes, issued by Manufacturer Hanover in 1988, contain explicit options on the issuer's credit standing. In this security, Manufacturer's Hanover agreed to pay investors a spread above LIBOR that increased with each incremental decline in the bank's senior debt rating.

From the standpoint of risk management, however, there is an obvious flaw in the design of this security. Although it may partially compensate investors for increases in risk, it actually increases the probability of default instead of reducing it. The security increases the corporate debt service burden precisely when the issuing firm can least afford it—when its credit rating has fallen and, presumably, its operating cash flow declined.

A hybrid structure designed to overcome this problem was a syndication of oil-indexed bonds created by Chase Manhattan for Sonatrach (the state hydrocarbons company of Algeria) in 1990. As illustrated in Figure 3, the transaction was structured so that Chase accepted two-year call options on oil from Sonatrach and then transformed those two-year calls into seven-year calls and puts that were passed on to the syndicate members. Investors were compensated for a below-market interest by a payoff structure that would provide them with higher payoffs in the event of significantly *higher or lower* oil prices.

15 Extendible notes also provide bondholders with an option on the firm's credit standing. But, unlike puttable debt, it represents the opportunity to benefit from increases in the firm's credit standing, or decreases in the spread. In the case of extendible notes, if the credit spread of the issuer decreases, the right to extend the maturity of the note (at the old credit spread) has value.

The combination of the put and conversion features are especially useful in controlling the asset substitution, or risk-shifting, problem. For this reason, the LYONs structure should be particularly attractive to issuers with substantial capital investment opportunities and a wide range of alternative investment projects.

For the issuer, however, the security requires higher payments to Chase *only in the event of higher oil prices*. If the price of oil declines, although the syndicate members receive a higher yield, the increase comes from Chase, not Sonatrach.

Using Hybrids to Reduce the Asset Substitution and Underinvestment Problems

Convertibles. At the outset, we noted that convertible bonds contain embedded options on the company's equity. By providing bondholders with the right to convert their claims into equity, management provides bondholders with the assurance that they will participate in any increase in shareholder value that results from increasing the risk of the company's activities—whether by leveraging up or undertaking riskier investments. By lowering current interest rates and thus reducing the likelihood of financial trouble, convertibles also reduce the probability that financially strapped companies will be forced to forgo valuable investment opportunities.[16]

Convertibles (and debt with warrants, their close substitutes) are also potentially useful in resolving disagreements between bondholders and shareholders about just how risky the firm's activities are. The value of convertibles are risk-neutral in the following sense: Unexpected increases in company risk reduce the value of the bond portion of a convertible, but at the same time increase the value of the embedded option (by increasing volatility). It is largely because of this risk-neutralizing effect—and for their role in reducing the "underinvestment problem" mentioned below—that convertible issuers tend to be smaller, newer, riskier firms characterized by high growth and earnings volatility.[17]

The Case of LYONs

While a number of bonds are puttable or convertible, the Liquid Yield Option Note (LYON) introduced by Merrill Lynch in 1985 is both puttable and convertible. The combination of the put and conversion features are especially useful in controlling the asset substitution, or risk-shifting, problem just described.[18] For this reason, the LYONs structure should be particularly attractive to issuers with substantial capital investment opportunities and a wide range of alternative investment projects (with varying degrees of risk).

It is thus interesting to note that the LYON structure was first used to fund companies where the asset substitution problem was acute. Take the case of Waste Management, the first issuer of LYONs. Although Waste Management is today a household name among even small investors, in 1985 the company could best be viewed as a collection of "growth options." As such it posed considerable uncertainty for investors.

THE ECONOMIC RATIONALE FOR ISSUING A HYBRID SECURITY

We are still left with a fundamental question: Given the well-functioning, low-cost markets for derivative products available today, why should a corporate issuer ever prefer the "bundled" hybrid to simply issuing standard debt and buying or selling the derivatives. We now discuss the following three reasons why corporate management might choose hybrids:

(1) If the firm issuing the hybrid can provide investors with a "play" not available otherwise—that is, a derivative instrument not available in the traded derivatives markets—the issuing firm will consequently be paid a premium for "completing the market."

(2) The hybrid may enable the issuer to take advantage of tax or regulatory arbitrages that would lower the cost of borrowing.

(3) By embedding a risk management product into a hybrid, the issuer may be able to obtain hedge accounting treatment, which may not be allowed if the derivative was bought or sold separately.

Using Hybrids to Provide Investors with a "Play"

The most straightforward reason for issuing a hybrid is to provide investors with a means of taking a position on a financial price. If the issuer provides a "play" not otherwise available, the investor will be willing to pay a premium, thereby reducing the issuer's cost of funding. (And, if the hybrid provides

16 More technically, the underinvestment problem arises from the fact that, in financially troubled firms, an outsized portion of the returns from new investments must go to help restore the value of the bondholders' claims before the shareholders receive any payoff at all. This has also been dubbed the "debt overhang" problem.

17 For an exposition of this argument, see Michael Brennan and Eduardo Schwartz, "The Case for Convertibles," *Chase Financial Quarterly* (Fall 1981). Reprinted in *Journal of Applied Corporate Finance* (Summer 1988).

18 As described at length in the next article in this issue, the put feature also enabled Merrill Lynch to tailor the security for its network of retail investors.

investors with a "scarce security" not otherwise obtainable, it may also provide corporate issuers with a hedge they can't duplicate with derivative products.)

The "play" can be in the form of a forward contract. Perhaps the best example of such is dual currency bonds, which provided investors with foreign exchange forward contracts with longer maturities than those available in the standard market. The forward contracts embedded in dual currency bonds have maturities running to 10 years, whereas liquidity in the standard foreign exchange forward market declines for maturities greater than one year, and falls very significantly beyond five years.

The "play," however, has more commonly been in the form of an option embedded in the bond—generally an option of longer maturity than those available in the standard option market. Sunshine Mining's Silver Indexed Bond fits this category, as do Standard Oil's Oil Indexed Note and the gold warrants issued by Pegasus Gold Corporation. In 1986 long-dated options on stock market indices were introduced with the development of hybrid debt in which the principal was indexed to an equity index. While the first such debt issues were indexed to the Nikkei, Salomon Brothers' "S&P 500 Index Subordinated Notes (SPINs)" have probably received more public attention. A SPIN is convertible into the value of the S&P 500 Index, rather than into an individual equity. Since then, debt has been issued that is indexed to other equity indices (for example, the NYSE index) or subsets of indices. For example, in 1991, United Technologies issued a zero-coupon bond indexed to the S&P Pharmaceutical Index.

Using Hybrids to "Arbitrage" Tax and/or Regulatory Authorities

Hybrid debt has also been used to take advantage of asymmetries in tax treatment or regulations in different countries or markets. One classic example is a case of "arbitrage" reported in *Business Week* under the provocative title, "A Way for US Firms to Make 'Free Money'." The "free money" came from two sources:

(1) A difference in tax treatment between the U.S. and Japan—the Japanese tax authorities ruled that income earned from holding a zero-coupon bond would be treated as a capital gain, thereby making interest income on the zero non-taxable for Japanese investors. In contrast, U.S. tax authorities permitted any U.S. firm issuing a zero coupon bond to deduct from current income the imputed interest payments.

(2) A regulatory arbitrage—The Ministry of Finance limited Japanese pension funds' investments in non-yen-dominated bonds issued by foreign corporations to at most 10% of their portfolios. The Ministry of Finance also ruled that dual currency bonds qualified as a yen issue, thus allowing dual currency bonds to command a premium from Japanese investors.

Consequently, U.S. firms issued zero-coupon yen bonds (to realize the interest rate savings from the tax arbitrage), and then issued a dual currency bond to hedge the residual yen exposure from the yen zero, while realizing a further interest savings from the regulatory arbitrage.

Tax-Deductible Equity. Perhaps the most thinly disguised attempt to issue tax-deductible equity was the *Adjustable Rate Convertible Debt* introduced in 1982.[19] Such convertibles paid a coupon determined by the dividend rate on the firm's common stock; moreover, the debt could be converted to common stock at the current price at any time (i.e., there was no conversion premium). Not surprisingly, once the IRS ruled that this was equity for tax purposes, this structure disappeared.

On a less aggressive level, hybrid structures like Merrill Lynch's LYON take advantage of the treatment of zero coupon instruments by U.S. tax authorities—that is, zero coupon bonds allow the issuer to deduct deferred interest payments from current income (although the holder of the bond must declare them as income). Given the impact of the IRS ruling on adjustable rate convertible debt, it is not surprising that a great deal of attention has been given to the tax status of the LYON.

Using Hybrids to Obtain Accrual Accounting Treatment for Risk Management

If a U.S. company uses a forward, futures, swap, or option to hedge a specific transaction (for example, a loan or a purchase or a receipt), it is

19 This point is made by John Finnerty in his article in this issue

Except for the highest-rated companies, most firms today face *non-price* credit restrictions that have greatly enlarged credit spreads. Many such companies are using hybrid debt to lower their risk profile and thus avoid the higher funding costs now associated with being a riskier borrower.

relatively simple to obtain accrual accounting treatment for the hedge. (Changes in the market value of the hedging instrument offset changes in the value of the asset being hedged, so there is no need to mark the hedging instrument to market.)

If, however, the firm wishes to use one of the risk management instruments to hedge expected net income or an even longer-term economic exposure, the current position of the accounting profession is that the hedge position must be marked to market. Some companies have been reluctant to use derivatives to manage such risks because this accounting treatment would increase the volatility of their reported income—*even while such a risk management strategy would stabilize their longer-run operating cash flow*.

With the use of hybrids, by contrast, which contain embedded derivatives, the firm may be able to obtain accrual accounting treatment for the entire package. Accountants are accustomed to valuing convertible debt at historical cost; and, given this precedent, they can extend the same treatment to hybrids.[20]

CONCLUDING REMARKS

Beginning in 1980 with Sunshine Mining's issue of silver-linked bonds, U.S. corporations have increasingly chosen to raise debt capital by embedding derivatives such as forwards or options into their notes and bonds. In the early '80's, such hybrids typically provided investors with payoffs (at first only principal, but later interest payments as well) indexed to commodity prices, interest rates, and exchange rates. But, in recent years, companies have begun to issue debt indexed to general stock market indices and even subsets of such indices.

Critics of such newfangled securities view them as the offspring of "supply-driven" fads. According to this view, profit-hungry investment banks set their highly-paid "rocket scientists" to designing new securities that can then be foisted on unsuspecting corporate treasurers and investors.

As economists, however, we begin with the assumption that capital market innovations succeed only to the extent they do a better job than existing products in meeting the demands of issuers and investors. The evidence presented in these pages, albeit anecdotal, suggests that hybrid debt is a capital market response to corporate treasurers' desire to manage pricing risks and otherwise tailor their securities to investor demands. In some cases, especially those in which hybrids feature long-dated forwards or options, hybrids are furnishing investors with securities they cannot obtain elsewhere.

Like the remarkable growth of futures, swaps, and options markets beginning in the late '70s, the proliferation of corporate hybrids during the '80s is fundamentally an attempt to cope with increased price volatility. The sharp increase in the volatility of exchange rates, interest rates, and oil prices—to name just the most important—during the 1970s provided the "necessary condition" for the rise of hybrids.

But another important stimulant to hybrids has come from other constraints on companies' ability to raise debt. In the early '80s, for example, when interest rates were high, hybrid debt was used by riskier firms to reduce their interest costs to manageable levels. Given the current level of interest rates today, most companies would likely choose to borrow as much straight debt as possible. But except for the highest-rated companies, many firms also now face *non-price* credit restrictions that have greatly enlarged credit spreads. In some such cases, companies are using hybrid debt to lower their risk profile and thus avoid the higher funding costs now associated with being a riskier corporate borrower. In other cases, hybrids are providing access to debt capital that would otherwise be denied on any terms.

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20 See J. Matthew Singleton, "Hedge Accounting: A State-of-the-Art Review," *Journal of Banking and Finance*, 5 (Fall 1991), pp. 26-32.