

The Case of Shearson's Unbundled Stock Units: Why Did They Fail And Can Value Be Created?

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Abstract

This paper uses rudimentary financial models to examine the valuation consequences of Shearson's now defunct financial innovation, unbundling. Though in its present form, this attempted financial innovation did not survive, a discussion of the potential value that may have been created is not without merit. First such a discussion may provide insights useful for future innovations. But perhaps more importantly, we suggest that under certain circumstances, for specific firms, unbundling does have the potential to create value.

Introduction

In 1867, the then United States Secretary of State, William Henry Seward, negotiated the purchase of Alaska from Russia for 7.2 million dollars (about 2 cents per acre). The press at the time was widely critical, calling Alaska Seward's "ice box" and Seward's "folly." For nearly thirty years thereafter Alaska was virtually ignored by the press and the world. But in 1896, the discovery of vast reserves of gold again brought Alaska to the attention of the world. The climax of the gold rush was followed by the discovery of other valuable resources: namely coal, oil, and copper.

This article raises the question of whether the analogy of "Seward's Folly" is appropriate for Shearson's now defunct financial innovation, the unbundled stock units (USUs). Is unbundling folly? Has Shearson forgotten the lessons of basic finance? Shares are not unique works of art. The proposed unbundling of the equity of Pfizer, Dow Chemical, American Express, and Sara Lee may not have offered the market any cash flow streams that were not already available - near zero coupon bonds, preferred stock, and warrants. Well-established financial theory (Modigliani and Miller, 1958) tells us one cannot increase the market value of the firm simply by repackaging the paper claims to its real assets.(1) If unbundling failed to make the market more complete, eliminating or reducing transaction costs is another source of value creation. In order for the complex package of unbundled units to sell for more than the singular financial claim in the form of equity there must

be investor demand and costs to repackaging on both the demand and the supply side. Shearson seems to have anticipated investor demand, and they are well aware of their own supply costs. But they seem to have forgotten—there may be only trivial costs on the demand side. Investors who want (near) zero coupon bonds can buy them in ample quantity in the market. The same is true regarding stock and warrants. On the face of things it appears Shearson's unbundling is sheer folly. But perhaps we have yet to discover the richness of that plan. What follows is a brief history and an analysis of that plan.

History

In early December 1988, Shearson Lehman Hutton, Inc. proposed one of the largest share repurchases ever. Generally, shareholders were asked to exchange 10 percent to 20 percent of a company's common stock for a package of bonds, preferred stock and equity-appreciation certificates (warrants). These new "unbundled stock units" were to be listed on the New York Stock Exchange.(2) The American Express offer was typical. On Monday, December 5, 1988, American Express had a closing price of \$26.875 and a total market value of approximately \$11 billion. Investors who were willing to return their American Express stock would receive a 30 year bond that paid 84 cents a year in interest and had a maturity repayment of \$75, a preferred stock which would pay dividends equal to any increases in American Express dividends over the next thirty years,

and an equity appreciation certificate that did not pay dividends or interest, but let the holder exercise for American Express Stock at a strike price of \$75 in 2019.(3) These exchanges, of stock for unbundled units were ruled taxable transactions, so it was apparently Shearson's hope that the unbundling would appeal to tax-exempt institutions. Shearson apparently believed the allure for the investor would be that the unbundled shares would reflect investor goals more accurately—certain income, capital gains, and a speculative instrument—better than the firm's equity does.

However, the market appeared to balk. Few investors came forward wanting to be the "early birds" to exchange their stock for unbundled units.(4) And after a ten-week sales campaign, Shearson continued to be surprised by market inertia:(5) George Reagan, equity manager of the Teacher Retirement System of Texas was quoted in *Business Week* as saying that if there is "any advantage to the investor it is not discernable."(6)

Investors appeared to be concerned that they were losing their voting power, something that is obviously important in the takeover climate that has prevailed in the market in recent years. Other concerns may have been that illiquidity in the marketplace would cause the unbundled units to sell at a discount, not a premium, over the stock price. Had Shearson forgotten basic finance?

For investors whose goals are certain income, capital gains, and speculation, securities already exist in the market that could be purchased to reflect these goals. There is nothing special about the shares of Dow, Pfizer, Sara Lee, or American Express. The risk, return package they represent could be purchased elsewhere using other securities or combinations of other securities. An important component of what Shearson proposed is that holders give up their voting power. For a price, a premium over the current terms, some holders may have been willing to do this.(7)

If we view the exchange under the paradigms of "option pricing theory," we can see the equity of the firm as an option on the portfolio of unbundled units. Further, we can view the unbundled units, as options on the firm.(8) It is well established that a portfolio of options (unbundled units) is worth no less (perhaps more) than an option on the portfolio (the individual stock).(9) This financial theory seems to imply what Shearson had hoped, that unbundling (creating a portfolio of individual options on the firm) has the potential to create value.

Nonetheless, market participants were not stupid. A "Catch 22" is present which has the potential to explain the market inertia.(10) The theory of finance tells us that as long as time remains before the expiration of an option, that option may appreciate in value. This alone may cause prudent investors to have a "wait and see" attitude. Further, once the unbundling announcement is made, the stock becomes a compound option, an option on the unbundled units which are themselves options on the value of the firm. It is only when the stock price at the announcement of the unbundling increases in value more than the debt-equity ratio increase would we expect the now compound option (stock) to be exercised in exchange for the unbundled units. [For the financial theory and the mathematics which explain this, see the appendix.] Thus unbundling may create value, but announcing it changes the characteristics of the stock in such a way that prudent investors would prefer to wait to potentially obtain maximum value.

In response to market inertia Shearson revamped its marketing strategy and invited Goldman Sachs to share in the fees the issuing companies would pay.(11) The hope may have been that Goldman Sachs would be able to attract more institutional interest in the exchange.(12) However, even that attempt failed. And, for the time being at least, unbundling is now a defunct innovation.

Is the entire concept of unbundling, as *Business Week* suggests, "The Greatest Invention Since....Burnt Toast?" The authors of this article argue perhaps not. Unbundling has an advantage for corporations—a reduction in corporate taxes.(13) Taxable dividend payments on common stock are converted into tax-deductible coupon payments on bonds. Thus for companies like Dow Chemical, American Express, and Sara Lee, the addition of tax shields may create value for shareholders.(14) Further, the mathematics of option pricing tells us that companies with a great deal of stock price volatility are likely to be those for whom exercise of the option to unbundle may be consummated.

An Analysis

We calculate that in a rational market, to make the proposed unbundlings fly a premium would have had to be paid. Shearson could also have attached voting rights to the USUs, but it is not clear how this alone might have motivated the market to exchange. Further, attaching voting rights to the bonds may have jeopardized the tax-deductibility of interest. Attaching them to the preferred stock or warrants may have given a potential acquiror voting rights at a cost more cheaply

than buying common stock. Alternatively, Shearson could have sweetened the dividend on the preferred stock, thus transferring wealth from shareholders who do not tender to those who do. Since non-tendering shareholders are likely to be the "small" tax-paying holders as opposed to the "larger" tax-exempt institutions, this hardly seems a prudent political maneuver. The most obvious and natural candidate for a sweetener is an increase in the value of the bonds. Our calculations show that a mere four percentage point rise in market interest rates would wipe out the value of the bonds Shearson offered, making them nearly worthless. Increasing the coupon on the bond gives an advantage to both the tendering shareholder and the non-tendering shareholder. For the shareholder who tenders there is an increased coupon payment over his former dividend. For the non-tendering shareholder a capital gain (the increased stock price) occurs as a result of the increase in the corporate tax shields. We believe that unbundling is not Shearson's folly, but rather unmined gold that Shearson apparently does not yet know how to extract.

Using the traditional, simple, and basic models of corporate finance we can place an approximate value or market price on the individual components of the unbundled units as of any date we choose. The necessary data is attainable by any investor from the Dow Jones News Retrieval Services. The value of the bond can be represented as simply the present value of the expected future cash flows accruing to bond holders over the life of the bond:

$$V = \sum_{t=1}^{30} \frac{I_t}{(1+K_d)^t} + \frac{M}{(1+K_d)^{30}}$$

Where V is bond value, I is coupon interest, and M is the maturity repayment

For K_d , the market's required rate of return on debt, we choose the rate on a 30-year government bond, since these corporations are well-established ones whose debt is relatively default risk free. Admittedly, this choice biases our calculation upward somewhat, but given the relative stability of these corporations, and the eventual resulting (small) value, the choice seems appropriate. Approximate bond values are provided in Table 1, Column 8.

The value of the preferred stock can simply be approximated as an application of the constant growth model for valuing shares—next period's dividend divided by the required return on equity minus the growth rate:

$$P_o = \frac{D_1}{K_s - g}$$

Thus the preferred stock is worthless if there is no dividend appreciation. This valuation approach may be overly simplistic. Dividends seldom grow at a constant rate. But all of these firms are those for which there has historically been an increase in dividends. Rational market participants might reasonably expect future increases, giving the preferred stock value.

Using the Capital Asset Pricing Model or adding a risk premium to the firm's bond yield provides an approximate cost of capital, (investor—required rate of return) for each firm. Again, the necessary data, to do this: firm beta, historical return on the market, and the risk-free Treasury Bill rate can be obtained from the Dow Jones News Retrieval Service:

$$CAPM: E(K_s) = R_f + \beta_s[E(K_m) - R_f]$$

where K_s is the discount rate required by the firm's shareholders, K_m is the return on the market, β is the firm's measure of systematic risk, and R_f is the 3 month Treasury Bill rate.

We assume that the five year average historical growth rate of dividends continues for each firm and calculate the approximated preferred stock values listed in Table 1, column 9.

The warrants can be valued according to the Black-Scholes option pricing model multiplied by a term that reflects their dilution factors.(15)

$$W_o = \frac{C^{BS}}{(1+q)}$$

For $(1+q)$ we assume the lower boundary of Shearson's targeted exchange, 10 percent, adjusted by the number of warrants which must be tendered in exchange for a share upon exercise. C^{BS} , the value of a equivalent call, can be obtained from the Black Scholes model and is a function of five variables: the stock price, the exercise price, the time to maturity, the risk-free rate of interest, and the volatility of the underlying stock.(16) The stock price on any given day is directly observable. We calculate the warrant value as a function of the exercise price taken to be the lower bound of bond value that is provided by Shearson since in most cases using the upper bound creates a value of zero. Further, we use one year to maturity in our calculation. Again this bases our result upward. Doing so is equivalent to assuming that the present value of the proceeds from exercise of a long-term warrant are negligible.(17) A comparable one-year Treasury Bill yield is used for the risk-free rate, and the volatility of the underlying stock is determined by calculating the volatility implicit in the market price of already publicly traded options on the

TABLE 1

The Separate Market Values of Unbundled Units

Unbundled Company Name	Stock Price ¹	Treasury Bond Yield ²	Treasury Bill Yield ³	Beta ⁴	σ_s ⁵	Historical Growth of Dividends ⁶	Bond Value	Duration in Years ⁷	Preferred Value	Warrant Value	Unit's Value
American Express	30.50	.097287	.0894	1.09	.318	.8%	14,218	18.209	1.53	3.98	19.72
Dow Chemical	92.875	.097567	.0894	1.535	.248	1.2%	42,298	16.810	5.06	-0-	47.35
Pfizer	55.25	.097362	.0894	1.21	.218	2.2%	32,263	16.396	7.24	-0-	39.50
Sara Lee	46.375	.097438	.0902	1.33	.288	2.8%	23,133	17.587	6.55	-0-	29.68

1. On March 17th, 1989 the day of calculation and immediately prior to cancelation.
2. Necessary for discounting corporate debt.
3. Necessary for warrant valuation.
4. As provided by Dow Jones News Retrieval.
5. The Market's expectation of future volatility of the stock, implied in the current call price.
6. As reported by Dow Jones News Retrieval.
7. A measure of the bond's cash flow maturity.
8. The addition of bond, preferred, and warrant values.

TABLE 2

Tax and Volatility Estimates for Unbundling Firms

Company Name	Pro-Forma Taxes Paid (Most Recent Fiscal Year) ¹	Provision For 1989 Taxes ²	Volatility ³
Dow Chemical	\$871,000,000	387,000,000	.218-.248
American Express	213,000,000	56,000,000	.243-.318
Pfizer	292,000,000	88,900,000	.133-.218
Sara Lee	188,000,000	87,423,000	.223-.288

- 1,2. Unaudited, from the Prospectus.¹
3. Implied from one-year call options on the stock.

TABLE 3
FIRMS WITH POTENTIAL UNBUNDLING BENEFITS¹

COMPANY	VOLATILITY			DIVIDENDS ³	TAXES ⁴	SHARES OUTSTANDING ⁵	POTENTIAL TAX SHIELD ⁶
	52 Week High	52 Week Low	Beta ²				
AMAX, INC.	\$ 29.75	\$ 19.35	1.82 u .92 d	\$.80	\$ 35,300,000q	85,227,000	\$ 13,636,320.
AMERADA HESS	42.75	25.13	1.24 u 1.22 d	.60	25,566,000	81,978,552	9,837,426.
ASARCO, INC.	35.88	23.00	1.69 u .95 d	1.60	66,919,000	42,013,523	13,444,327.
BARD, C.R. INC.	26.50	18.75	.13 u 1.18 d	.40	45,100,000	61,361,984	4,908,958.
COMBUSTION ENGINEERING	35.50	25.75	1.13 u 1.73 d	1.00	5,947,000	38,753,596	7,750,719.
EDWARDS, AG, INC.	25.75	15.78	1.11 u 1.41 d	.62	17,348,000	20,631,650	2,558,324.
FREEPORT MCMORAN, INC.	38.00	24.63	1.27 u 1.09 d	1.50	178,556,000	138,381,792	41,514,537.
GENERAL INSTRUMENTS	37.25	21.25	1.41 u 1.29 d	.50	51,400,000	33,914,000	3,391,400.
HUMANA, INC.	39.50	22.63	1.38 u 1.09 d	1.04	126,602,000	97,886,147	20,360,318.
KERR-MCGEE	51.75	34.30	1.20 u 1.19 d	1.32	55,000,000	48,326,918	12,758,306.
MERRILL LYNCH	36.75	23.50	1.02 u 1.25 d	1.00	175,513,000	98,686,499	19,737,299.
NATIONAL MEDICAL ENTPRS	36.13	20.00	1.23 u 1.25 d	.73	114,000,000	73,380,474	10,713,549.
PAINE WEBBER	23.63	15.30	1.02 u 1.45 d	.52	20,863,000	27,968,746	2,908,749.
WASTE MANAGEMENT	\$ 60.50	\$ 38.00	1.04 u 1.20 d	\$.60	\$282,117,000	224,712,899	\$ 26,965,547.
WILLIAMS CO.	43.63	29.50	1.48 u 1.31 d	1.40	22,000,000q	38,033,232	10,649,304.

1. This is not the universe of potentially beneficial USUs. The authors considered firms whose option market volatility seemed to make them potential candidates.
2. "u" and "d" refer to up and down markets.
3. Dividends per share.
4. Most recent tax reported.
5. Shares outstanding as reported by Dow Jones News Retrieval.
6. Potential tax shield is calculated for the entire firm assuming 20 percent of holders choose to unbundle, and firm converts the entire dividend per share to an equivalent coupon payment.

firm. Column 11 of Table 1 provides the resulting estimated warrant values.

Using these simple valuation models we calculate an approximate value of the unbundled units as that provided in Column 12 of Table 1. Casual observation indicates that in all cases the sum of the unbundled unit values is less than the current stock price. The long-term bond is equal to a small premium over the yield on the zeros at the time. The stock has value which results from an assumed increase in dividends. And except for American Express, the warrant is worthless due to the fact that its exercise price (a percentage of the face value of the new debt) is so far out of the money. These calculations are insensitive to reasonable changes in volatility and the risk-free rate. These results may be compared to those of Finnerty and Borun (1989). The mathematics of their analysis uses different financial models than does ours, with their resulting approximate values ranging from thirty-four to thirty-nine percent of ours. Noteably, their valuation of the USUs are smaller than ours and also smaller than the stock price at the time of the unbundling plan.

The above results may be interpreted by some as supporting the earlier suggestion that Shearson had forgotten basic finance. There is no premium to be paid for any particular packaging of the paper claims on a firm's assets. However, there are conditions under which value can be created. Specifically, these conditions occur when the conversion of dividends to coupon payments is useful as a tax shield and when the firm's stock price is volatile. Extreme stock price volatility has the potential to create an in-or-at-the-money warrant. Further, stock price volatility may create a share price increase at the announcement of the unbundling which makes the theoretical portfolio of options (unbundled units) more valuable than the firm's stock. Examining these parameters for the present firms indicates that American Express had the best potential to create value from unbundling (see Table 2). Pfizer, on the other hand, paid no taxes in 1987 as a result of foreign tax credits. When there are no potential increases in tax shields, one wonders why management or shareholders of any corporation would consider incurring the administrative costs necessary for unbundling. Even when there are potential tax shields available from unbundling, these shields need to be compared to others that are available. Further, corporate tax shields have the potential to create value only when they are not offset by personal tax liabilities.

Do these figures imply that unbundling is doomed to fail? Not necessarily. We believe that, as with any innovation, it takes time to perfect the technology.

Unbundling can create value, particularly if the premium necessary to purchase the loss of voting power is eliminated as an issue. We suggest this premium be eliminated by allowing for conversion between unbundled units and the underlying stock. In this fashion arbitrage would tend to eliminate market price differentials between the stock and the units. Thus unbundling may result in an increase in share value in the same fashion that any capital structure change can when usable tax shields are generated. Further, volatile share prices might make the unbundled units valuable as an option. The mechanics of option valuation tell us that, all else held constant, a higher stock price volatility implies higher option values. Below is a list of firms (and their shareholders) which we believe have the potential to benefit from unbundling. Each of these firms has historically exhibited substantial price volatility, each has a relatively high pay-out, and each expects to pay corporate income taxes. This list of firms is by no means exhaustive.(see Table 3.) In conclusion, we believe the gold rush in unbundling has not yet occurred. Unbundling is an innovation that creates a tax shield for corporations. Any reduction in corporate taxes results in an increase in the level of cash flows available to the firm and its equity holders and thus an increase in the market value of the firm's stock. Firms which can successfully take advantage of this new and innovative tax shield are those whose stock price volatility makes the exchange of shares for unbundled units attractive.

Endnotes

- 1 See Modigliani and Miller (1958). Of course this theory applies to perfect markets. U.S. capital markets contain imperfections (such as taxes and transactions costs) that may tend to invalidate this proposition.
- 2 See George Anders, "Some Big Firms to Break up Stock Into New Securities," *Wall Street Journal*, 5 December 1988, p. C1, C5.
- 3 See American Express Red-Herring Prospectus.
- 4 See George Anders, "Shearson Revamps Marketing Strategy in New Securities," *Wall Street Journal*, 28 December 1988, p. C1, C6.
- 5 See George Anders, "Shearson's 'Unbundled Unit' Plan Faces Change in Bid for Acceptance," *Wall Street Journal*, 16 February 1988, p. C1, C5.
- 6 See Jon Friedman, "The Greatest Invention Since....Burnt Toast?" *Business Week*, 6 March 1989, p. 88.

7 The various prospectus do note the circumstances under which preferred stock and equity appreciation certificate holders are entitled to vote or to "re-exchange" their units for stock. Merger is one such circumstance. Essentially, however, these conditions appeared to fail to reflect the SEC requirement of one share, one vote.

8 See Black and Scholes (1973).

9 See Merton (1973).

10 *Catch 22*, the novel, was written by Joseph Heller.

11 See Anders, 28 December 1988.

12 See Friedman, Op.Cit.

13 However, for some firms there may be other, simpler or less expensive ways to create corporate tax shields.

14 Notably, Pfizer paid no corporate taxes in 1988 as a result of foreign tax credits, according to the Dow Jones News Retrieval Service.

15 See Ritchken (1987).

16 $C^{BS} = S \cdot N(d_1) - Xe^{-R_f T} \cdot N(d_2)$

where:

$$d_1 = \frac{\ln\left(\frac{S}{X}\right) + (R_f + .5\sigma)T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

and N is the cumulative, standard normal distribution function, that is:

$$N(d_j) = \int_{-\infty}^{d_j} (2\Pi)^{-\frac{1}{2}} \exp\left(-\frac{t^2}{2}\right) dt$$

The Black-Scholes price is also adjusted for any expected future dividends accruing to the shareholder. We assume the expected future dividends in the near future are simply the naive expectation of historical dividends.

17 Clearly, if market participants expect substantial increases in the cash flows from these firms, this later assumption may be inappropriate. However, we have no rationale for suggesting market participants expect such future cash flow increases.

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APPENDIX

An Option Pricing Model Approach to Valuation

Black and Scholes (1973) were the first to note that corporate equity can be viewed as an option on the value of the firm. Their formula for calculating a call option's value (see footnote No. 14) can be translated into a model for calculating stock value, where stock price is a function of five variables, $S = f(V, D, T, \sigma_v, R_p)$: firm value, face value of debt, time to maturity of debt, the variance of rate of return on firm value, and the risk-free rate.

$$S = V \cdot N(d_1) - D e^{-R_f T} \cdot N(d_2)$$

$$\text{where } d_1 = \frac{\ln(S/D) + (R_f + .5\sigma) T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

A necessary pre-condition for the application of the Black- Scholes option pricing equation to calculating stock value is the collapsing of the firm's debt capital structure into one pure discount bond with one term to maturity. For practical approximations this may be done by collapsing the firm's debt portfolio in one bond with the duration of the portfolio as a measure of its time to maturity. Once unbundling is announced, the stock as an option on the value of the firm becomes a compound option, i.e., an option on the unbundled units which are themselves options on the value of the firm. Geske (1979) has developed the mathematics for valuing this stock or compound option as the sum of three terms:

$$nC0 = VN_2 \left[X, Y; \left(\frac{T_1}{T} \right)^{\frac{1}{2}} \right] - MR_f^{-T} N_2 \left[X - \sigma(T_1)^{\frac{1}{2}}, Y - \sigma(T) \right];$$

$$\frac{1}{2} \left(\frac{T_1}{T} \right)^{\frac{1}{2}} \left[-nKR_f^{-T_1} N \left(X - \sigma(T_1)^{\frac{1}{2}} \right) \right]$$

$$X = \frac{\log(V/\overline{VR}_f^{-T_1})}{\sigma\sqrt{T_1}} + \frac{1}{2} \sigma\sqrt{T_1}$$

and

$$Y = \frac{\log(V/MR_f^{-T})}{\sigma\sqrt{T}} + \frac{1}{2} \sigma\sqrt{T}$$

\overline{V} satisfies

$$\overline{VN}(Z) - MR_f^{-(T-T_1)} N(Z - \sigma\sqrt{T-T_1}) - nK - 0$$

where

$$Z = \frac{\log(\overline{V}/MR_f^{-(T-T_1)})}{\sigma\sqrt{T-T_1}} + \frac{1}{2} \sigma\sqrt{T-T_1}$$

V_0 = firm value

R_f = one plus the default-free interest rate

σ^2 = volatility of the value of the firm

T = maturity of the firm's debt

T_1 = maturity of the exchange offer ($T_1 < T$)

K = strike price or exercise price

M = face value of debt

n = the number of outstanding shares.

Although calculating market prices from the Geske formulation may prove intractable as a practical matter, Geske does provide the partial differentials of the compound option's (shares of the unbundling firm) value with respect to the function's arguments:

$$\begin{aligned} &\delta C / \delta V > 0; (2) \delta C / \delta M < 0; (3) \delta C / \delta T > 0; (4) \delta C / \delta R_f > 0; \\ &(5) \delta C / \delta \sigma^2 > 0; (6) \delta C / \delta K < 0, (7) \delta C / \delta T_1 > 0 \end{aligned}$$

These provide some insight into the effects of unbundling. First, unbundling shares into debt, preferred stock, and warrants creates additional debt in the firm's capital structure. As we can see from partial #2, this has an adverse effect on the call's (share's) value. Further, note that partial #5 relates the call (share) price to changes in the variance rate of return on firm value. This variance is unobservable, but is positively related to the variance of returns on the firm's shares:

$$\sigma_s = \left(\delta S / \delta V \frac{V}{S} \right) \sigma_v$$

Thus, as σ_s^2 increases with the announcement of the unbundling, we suspect σ_v^2 increases as well.(1),(2) Here there is a positive effect on stock value. However, the first-order equity effect ($\delta C / \delta M < 0$) of increasing the corporate debt will dominate the second-order variance effect, and the likely net result from these factors will be a decrease in the call (share) value. This is one reason we suspect that investors have a "wait and see" attitude, choosing not to exercise their option (common shares) and exchange it for the portfolio of options (unbundled units). As long as time remains before the exchange opportunity expires ($\delta C / \delta T_1 > 0$), the option (shares) may appreciate in value.(3) Of course, if the call (share) appreciates in value, its value must still be less than or equal to the value of the portfolio of options. Thus, there is some chance that the portfolio of unbundled units will be more valuable than the stock. In particular, when the stock prices rises at the announcement of the unbundling opportunity by more than unbundling increases the debt equity ratio, we would expect the compound call may be exercised in exchange for the unbundled units. A short time to expiration of this exchange offer would facilitate the exchange (See partial #7). This is the "Catch 22" nature of the unbundling swap Shearon has proposed. By itself, it seems unbundling should create value. At the very least, unbundled units should theoretically sell for no less than the share price. However, once the opportunity is announced, the original company share is changed in nature and becomes a compound option. At that point, the predominant effect seems to be a decrease in value. As long as time remains before expiration of the opportunity,

investor rationality would seemingly preclude the actual exchange. Apparently, only firms with high stock price volatility have the potential of creating unbundled units which are more valuable than the underlying stock.

Appendix Endnotes

1 See Ball and Brown (1968), Kalay and Loewenstein (1983), Christie (1983), Ohlson and Penman (1985) and Jennings and Stark (1986) for evidence on the relationship between announcements of events and volatility changes.

2 Further market fluctuations in stock price are a determinate of variation in the debt-equity ratio. Any decrease in S causes an increase in the firm's debt-equity ratio, thereby increasing the riskiness of the return on the firm's common stock. As above, this increase in the variance of stock returns will act to increase the value of an option on the stock.

3 Merton (1973).