DEFAULT RISK PREMIA IN THE NEAR-CASH INVESTMENT MARKET: THE CASE OF AUCTION RATE PREFERRED STOCK VERSUS COMMERCIAL PAPER

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Abstract:

Auction rate preferred stock (ARPS) is often regarded as an alternative to other near-cash instruments such as commercial paper while the dividend exclusion for ARPS offers tax advantages to corporate purchasers. The mean default risk premium for ARPS, relative to commercial paper, is estimated at 83 basis points during stable financial markets. This default premium appears to surge during unstable equity markets, having jumped by 192 basis points in November 1987. Lower-rated ARPS shows even larger changes, with yields 40-50 basis points above yields on high-rated ARPS, adjusted for the normal risk premium differential. The perceived risk change of ARPS underscores how quickly market participants re-evaluate default risk, and even the importance of the priority order among debt and equity claimants. Findings suggest ARPS and commercial paper are not an acceptable substitute for commercial paper during times of unsettled equity markets.

I. Introduction

The $8 billion auction rate preferred stock (ARPS) market is included as part of the market for near-cash investments. ARPS appears in the literature as an alternative to commercial paper (Brealey and Myers (1988), Ross, Westerfield, and Jaffe (1990)). For example, Brealey and Myers (1988) find ARPS to be an alternative to money market investments. Likewise, Wall Street markets ARPS as a substitute for commercial paper (Chambliss (1985)). Because it is equity and pays dividends, ARPS provides tax benefits to corporate investors. This tax advantage allows ARPS issuers to pay relatively low dividend yields.

In this study ARPS is evaluated as a near-cash investment with risk and return characteristics comparable to commercial paper. Findings indicate ARPS should not be viewed as a near-cash investment, especially during times of unsettled markets, such as October 1987.

II. ARPS versus Commercial Paper as Near-Cash Instruments

ARPS yields are set by telephone dutch auction each forty-nine days and are bid by potential buyers. All accepted bids receive the same settled rate (the stop- out rate), which is the highest of the lowest accepted bids. The settled dividend must fall between an upper and lower collar,

typically set at 59 percent and 110 percent to 125 percent of the current AA commercial paper rate. Given similar maturity and liquidity characteristics, yield differentials between ARPS and commercial paper must be explained by taxes and default risk.

To evaluate the tax effects of ARPS and commercial paper, assume the firm is financed with common stock, commercial paper, and ARPS only, and that all three securities are purchased by corporate investors as perpetuities (Miller (1977)). Let V_u and V_L be the value of an unlevered and levered firm; further, let CP_m be the amount of commercial paper financing at market. The value of the levered firm is given as follows:

$$V_L = V_U + \left[1 - \frac{(1 - t_{ic})\,(1 - t_{pc}\,(1 - t_e))}{(1 - t_{pc})}\right] CP_m \qquad (1)$$

where the corporate purchaser's tax rate is t_{pc}, the issuing corporation's tax rate is t_{ic}, and the dividend exclusion is t_e.[1] The second term on the right-hand side is the gain to commercial paper financing over either common stock or ARPS financing. When this term is greater than zero, a tax gain to commercial paper exists. When the issuing corporation and the purchasing corporation have the same tax rate $(t, = t_{pc})$, the relative dollar advantage to commercial paper financing is $CP_m[t_{pc}(1 — t_e)]$. In this case, the issuing firm always realizes a tax gain because the dividend exclusion is less than 100 percent. Thus, with a 34 percent marginal corporate tax rate and 70 percent dividend exclusion, the net dollar advantage to the issuer is (CP_m*0.1020). When the buyer is in the 34 percent tax bracket, the issuing firm increases its value by issuing ARPS only if its tax rate is less than 26.53 percent. Therefore, firms with large tax shields (low tax rates) should finance with ARPS rather than commercial paper.

If instead ARPS and commercial paper are held by corporations but common stock is held by individual investors with a personal tax rate t_{ps}, as per Miller (1977), the value of the levered firm is:

$$V_L = V_U + \left[1 - \frac{(1 - t_{ic})(1 - t_{ps})}{(1 - t_{pc})}\right] CP_m + \left[1 - \frac{(1 - t_{ps})}{(1 - t_{pc}(1 - t_e))}\right] ARPS_m \quad (2)$$

where $ARPS_m$ is the market value of ARPS. The net gain of commercial paper financing over ARPS financing is the second minus the third term on the right-hand side in equation (2).

$$G_{net} = \left[1 - \frac{(1 - t_{ic})(1 - t_{ps})}{(1 - t_{pc})}\right] CP_m - \left[1 - \frac{(1 - t_{ps})}{(1 - t_{pc}(1 - t_e))}\right] ARPS_m \qquad (3)$$

When $t_{ps} = t_{pc}$ and $t_e = 0$, the net gain to commercial paper G_{net} is identical to the tax gain in equation (1).

If tax effects indicate that firms in high marginal tax brackets should choose commercial paper instead of ARPS financing, other reasons must explain why highly profitable firms issue ARPS. An examination of the profile of ARPS issuers indicates that most are financial firms. It is reasonable to suggest that equity capital requirements set by regulators can be better met using ARPS, which has capital costs below

[1] Mathematical derivations of equations presented in this paper are available from the authors upon request.

common equity. Large financial firms might use ARPS financing despite the negative tax effects because ARPS is a lower priority claim than commercial paper. Unlike interest, preferred stock dividends can go unpaid in times of financial distress.

Miller (1977) extends the equilibrium conditions to allow for risky borrowing. Similarly, if commercial paper and ARPS have risk that can be priced according to the capital asset pricing model (CAPM), the value of the levered firm remains as shown in equation (1), assuming the interest rates on ARPS and commercial paper are risk adjusted to equal CAPM-expected returns.

Alderson, Brown, and Lummer (1987) suggest yield differentials between ARPS and commercial paper are primarily tax induced with little default risk effect. They find ARPS yields to be 202 basis points below commercial paper yields. For the purchaser, the after-tax spread (using the top tax rate of 46 percent in 1986) is found to be 96 basis points above commercial paper. For borrowers, ARPS costs 132 basis points more after taxes than commercial paper because of the tax deductibility of interest versus dividends. Alderson, Brown, and Lummer acknowledge that their analysis ignores investment risk because none of the auctions examined resulted in a loss of invested capital or dividend income. Therefore, they suggest that commercial paper and ARPS are equally low in risk with a remarkable degree of certainty, which occurs as a direct result of the seven-week dutch auction process. Recent experience, including failed auctions and dividends reset at the upper collar, suggests this view to be unduly optimistic.[2]

III. Data and Methodology

This research uses Salomon Brothers data on ARPS; Salomon calls them dutch auction rate preferred stock (DARPS). Salomon reports the outcome of ARPS auctions for 199 ARPS issues beginning in August 1984. The ARPS data include 1,170 auctions of ARPS consistently rated A or better by Moody's during the entire two and a half years, and 70 auctions of ARPS with Baa, Ba, or B ratings.[3] The total sample of 1,240 auctions represents 71 issues that were first marketed before first quarter 1986.

The main explanatory variable is the after-tax AA commercial paper rate. The highest tax rate for corporate purchasers is applied to the AA commercial paper index by year. After-tax ARPS yields should be comparable to after-tax commercial paper yields adjusted for default risk. The regression equation modeling this relationship is:

$$R_{arpst} = \alpha + \beta_1 R_{cpt} + \sum_{r=1}^{R} \beta_2 DF_{rt} + \sum_{a=1}^{A} \beta_3 D_{at} + \sum_{a=1}^{A} \beta_4 ID_{at} + \varepsilon_t \qquad (4)$$

where

[2] As an example, M-Corp's ARPS yielded 73 percent of the commercial paper index rate at early auctions. The yield increased as the company's credit deteriorated. An incomplete auction occurred in August 1987 when the dividend yield was reset at the upper collar limit of 150 percent. Successive auctions failed as the yields were set at the collar. In October 1988 M-Corp stopped paying its preferred stock dividends; in April 1989 the company failed.

[3] The limited number of auctions with low-rated issues reflects the high dividend cost issuers of low-rated ARPS must pay purchasers. The seventy auctions represent all auctions of low-rated issues from Salomon Brothers during this period.

R_{arpst} = after-tax return on ARPS securities at time t;
R_{cpt} = after-tax return on AA commercial paper index at time t;
DF_{rt} = dummy variables for the default risk on ARPS securities at time t according to a designated default risk rating r by Standard & Poor's;
D_{at} = dummy variables representing the abnormal yields on ARPS securities at the a^{th} auction at time t;
ID_{at} = interaction dummy variables representing the spread between high- and low-rated ARPS securities at the a^{th} auction at time t;
α = estimate of the intercept;
β_i = estimate of the slope coefficients; and
ε_t = the random error term for the ARPS securities at time t.

The commercial paper coefficient captures the related movement of ARPS and commercial paper yields. Dummy variables for the Baa, Ba, and B ratings capture the additional yield of low-rated issues above the high-rated (A or better) ARPS yield; the high-rated ARPS auctions are the reference base. The regression adjusts for changes in the risk premium each year by using dummy variables for 1987 and 1988. The regression has dummy variables for periods surrounding October 19 that capture abnormal yields in high-rated ARPS from changes in default risk.[4] These dummy variables might be expected to be significantly positive starting the week of October 19-25. Interaction variables measure the yield spread between high- and low-rated ARPS for the event period. These are time interval dummy variables multiplied by the dummy variable for high-rated ARPS. The interaction coefficients capture the basis-point differential between high- and low-rated ARPS for each interval.

IV. Empirical Results

The implied risk premium averages 83 basis points from January 1986 to June 1988. The implied risk premium is the ARPS yield minus the AA commercial paper yield adjusted for taxes at the highest rate and appropriate dividend exclusion each year. Alderson, Brown, and Lummer (1987) find a comparable premium of 96 basis points.

Table 1 reports the abnormal returns for the ordinary least squares regression. The after-tax AA commercial paper yield coefficient of 1.173 indicates ARPS yields move directly with commercial paper yields. In September and the weeks in early October before the market break, no significant abnormal returns were present. Positive abnormal returns averaging 79 basis points for high-rated ARPS occurred October 19-31. These grew steadily following October 19, and reached a maximum 192 basis-point spread during December. In early 1988 the spread declined.

Table 1 shows substantial yield differentials on lower-rated issues. This premium ranges from 120 basis points on Baa issues to 460 basis points on B issues. The yield differential between low- and high-rated ARPSs increased dramatically immediately following October 19. While high-rated ARPS had a 146 basis point abnormal yield in November 1987, the spread interaction variable shows that yield to be 41 basis points less than the yield on lower-rated ARPS, adjusted

[4] The seemingly unrelated regression (SUR) technique (Zellner (1962)) is often implemented for solving statistical problems associated with event clustering, which frequently occurs with a common event (Binder (1985)). The Parks (1967) procedure is equivalent to Zellner's two-stage SUR methodology applied to a generalized least squares model corrected for autocorrelation. The regression coefficients under Parks and ordinary least squares are nearly identical, indicating no problem with contemporaneous covariation of the error term.

for the "normal" difference in yield attributed to default risk in November. A significant yield differential of 28 basis points persisted into January 1988. These findings suggest that investors expected higher default rates following the market crash.

V. Conclusions

Finding suggest ARPS and commercial paper are not acceptable' substitutes during unsettling equity market conditions when corporate investors impose a substantially higher default risk premium on ARPS. The economic implications for ARPS purchasers and issuers are apparent during the period considered. For holders of an ARPS security with a $500,000 par value, purchasers received a monthly average of $540 to $1,306 more per auction. Issuers incurred substantial costs. For every $100 million of ARPS, issuers paid a monthly average between $117,470 and $283,910 more in dividend expenses per auction than normal.[5] For lower-rated issues, the dividend cost was even higher.

The costs reported represent unavoidable expenses for the issuer. ARPS contractual covenants place substantial mandatory redemption costs and penalties in the event of dividend default; indeed, ARPS holders sometimes gain voting rights. These serious consequences underscore the suggestion that ARPS can be a poor substitute for commercial paper.

[5] These additional returns for purchasers are determined by converting the highest and lowest coefficients found in Table 1 into decimals and multiplying by 49 days/360 days and the dollar amount: $500,000 X (0.01919 x (49/360)) = $1,305.99 and $500,000 x (0.00794 x (49/360)) = $540.36. For issuers, the largest after-tax dollar amount is found as follows: $100 million x (0.01919 x (49/360)) = $261,197.22. Solving for the before-tax ARPS yield (BTARPS), $261,197.22 = BTARPS (1-(.40)(.20)), results in a before-tax cost of $283,910.02. The 40 percent marginal tax rate and 80 percent exclusion reflect tax code provisions in 1987.

TABLE 1. Regression Results of After-Tax AA Commercial Paper Rates and ARPS Yields from January 1986 Through June 1988 (1,240 Observations).

Explanatory Variable	Coefficient (*t*-value)
Intercept	0.282
	(2.086)*
After-tax commercial paper	1.173
	(30.624)**
Risk shift dummy (1987)	-0.459
	(-15.667)**
Risk shift dummy (1988)	-0.593
	(-11.361)**
Rating Baa	1.198
	(21.538)**
Rating Ba	3.882
	(27.790)**
Rating B	4.598
	(49.085)**
9/1/87-9/30/87	-0.056
	(-0.630)
10/1/87-10/18/87	-0.011
	(-0.103)
10/19/87-10/31/87	0.794
	(6.363)**
11/1/87-11/30/87	1.459
	(15.460)**
12/1/87-12/31/87	1.919
	(22.327)**
1/1/88-1/31/88	0.264
	(2.657)**
2/1/88-2/28/88	0.208
	(2.142)*
Default risk spread (9/1/87-9/30/87)	-0.004
	(-0.035)
Default risk spread (10/1/87-10/18/87)	-0.231
	(-1.476)
Default risk spread (10/19/87-10/31/87)	-0.494
	(-3.105)**
Default risk spread (11/1/87-11/30/87)	-0.411
	(-3.492)**
Default risk spread (12/1/87-12/31/87)	-0.455
	(-4.271)**
Default risk spread (1/1/88-1/31/88)	-0.282
	(-2.107)*
Default risk spread (2/1/88-2/28/88)	-0.087
	(-0.728)
F-value	391.29**
Adjusted R^2	86.30%
Durbin-Watson	1.62

*Significant at the 5 percent level.
**Significant at the 1 percent level.

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