Discounts and Premiums on Shares of Diversified Closed-End Investment Funds

by

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PRELIMINARY

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In efficient markets stock prices reflect the underlying values of companies. Diversified closed-end investment funds, whose assets are publicly traded shares of other concerns, typically are not valued at the known value of the shares they hold. The price per share is usually at a discount from the net asset value per share and sometimes at a premium. Does this imply that the market is inefficient and irrational, or are there reasonable explanations for this phenomenon? Previous analyses have tended to conclude that there is no rational explanation for the observed deviations.[1] In this paper several explanations are proposed, and empirical analysis is carried out to test their validity. The explanations are not, for the most part, new. An excellent and critical discussion of most of them is to be found in Pratt.[2] What is new is the attempt to test empirically their validity.[3]

The empirical analysis is based on seven years of data for the principal closed-end funds in existence during the period 1965-1971.[4] The data are annual -- balance sheets and price data are as of December 31 of each year, and income statement data are for the year ending December 31. All data will be presented as a per share bases with adjustments for stock splits and stock dividends.[5]

A. PRICE AND NET ASSET VALUE COMPARED

Closed-end investment funds have outstanding a fixed number of shares (which may be increased by periodic new offerings) and do not redeem shares as do open-end funds. The i^{th} fund's net asset value per share at time t, $A_{i,t}$, is the market value of the fund's total assets

less claims prior to common stock divided by the total number of shares outstanding.[6] The market price is $P_{i,t}$ and relative premium is given by

$$q_{i,t} = \frac{P_{i,t} - A_{i,t}}{A_{i,t}} .$$

The average values of q for each of the 12 funds in the sample are as follows:

Adams	-.041
Dominick	-.099
General Am. Investor	-.021
Int. Holdings	-.170
Lehman	.059
Madison	.193
Overseas	.706
Surveyor	-.081
Tricontinental	-.127
U. S. & Foreign Secs.	-.153
Carrier & General	-.163
Niagra	-.027

Not only are there variations across funds in the premium, there are variations over time as the following figures show. (Because of the extreme positive values for Overseas, averages over funds are presented with and without Overseas.)

	Avg. q		
	With Overseas	Without Overseas	S & P Index
1964	--	--	.8475
1965	-.0700	-.1275	.9243
1966	-.0300	-.0225	.8033
1967	.0375	-.0582	.9647
1968	.1217	.0655	1.0386
1969	.1292	.0582	.9206
1970	-.0133	-.0436	.9215
1971	-.1317	-.1509	1.0209

These last figures suggest that stockholder returns on closed-end funds do not vary directly with the value of the fund portfolios. This can be seen more directly be regressing the annual rate of return using price per share against the annual rate of return using net asset value per share.

Let

$$r^{p}_{i,t} = \frac{P_{i,t} - P_{i,t-1} + I_{i,t} + C_{i,t}}{P_{i,t-1}}$$

$$r^{a}_{i,t} = \frac{A_{i,t} - A_{i,t-1} + I_{i,t} + C_{i,t}}{A_{i,t-1}}$$

$P_{i,t}$ = market price of fund i at time t

$A_{i,t}$ = net asset value of fund i at time t

$I_{i,t}$ = income dividends paid during year ending at t

$C_{i,t}$ = capital gains dividends paid during year ending at t.[7]

(Subscripts will be dropped when the meaning is clear.)

All funds and years are pooled into a single regression the results of which are as follows:

(1) $r^{p}_{i,t} = \underset{(-.681)}{-1.084} + \underset{(10.950)}{1.0555}\, r^{a}_{i,t}$ $\quad R^2 = .589$ $\quad DW = 1.463$ $\quad SE = 12.687$ $\quad DF = 83$

Terms in parentheses are t values and R^2 = coefficient of determination, DW = Durbin-Watson statistic, SE - standard error about regression, DF = degrees of freedom.

It is surprising that the variation in r^a explains only 58.9% of the variation in r^p. There are variations in r^p which are not apparently explained by fluctuations in the market value of the assets held by the funds. However, the slope coefficient is not significantly different from

one, and this implies that changes in r^p correspond, on average, to changes in r^a.

Regressions of r^p and r^a against the market rate of return, r^m, were also run. The market return is the percentage price change on the S & P 500 Index and does not include dividends. The regression results for all data pooled are as follows:

(2) $$r^p_{i,t} = \underset{(2.155)}{3.531} + \underset{(8.638)}{1.2081}\ r^m_t \qquad R^2 = .470 \quad DW = 1.400 \quad SE = 14.405 \quad DF = 83$$

(3) $$r^a_{i,t} = \underset{(5.231)}{4.571} + \underset{(14.549)}{1.0849}\ r^m_t \qquad R^2 = .717 \quad DW = 2.253 \quad SE = 7.681 \quad DF = 83$$

The much higher correlation of r^a with r^m than of r^p with r^m reflects greater correspondence to market movements in r^a than in r^p.[8] It appears that market returns on closed-end funds (using price) behave very much like returns on any other stock, despite the fact that the underlying asset owned *is a diversified* portfolio. The larger slope coefficient in (2) than in (3) indicates that "systematic" risk as well as "unsystematic" risk are greater for r^p than for r^a. However, this difference is not statistically significant. The intercept terms in the two regressions reflect in large part the ommission of dividends from r^m.

This first look at the divergence between price and net asset value indicates that there is indeed something to be explained. The variations in q across funds and across time and the large random element in the relation between r^p and r^a would, in the absence of other explanations, imply market inefficiencies. We turn now to some other possible explanations.

B. POSSIBLE DETERMINANTS OF DEVIATIONS BETWEEN NET ASSET VALUE PER SHARE AND PRICE PER SHARE

1. Tax Liability

The discount or premium on a fund is said to be a function of the capital gain or loss existing at the time the investor purchases shares. Thus a fund with net asset value of $30 per share and a cost basis of 20 per share has an unrealized capital gain of 10 for which tax is due when the gain is realized. If the cost basis were 35, an unrealized loss of 5 would exist which could be used as an offset against future gains of the fund or of other investments, thereby reducing the investor's taxes. A new investor, it is argued, would be liable for a tax if gains were relaized the day after his purchase and would receive a tax benefit if losses were realized.

As Pratt points out there is a fallacy in this simple argument. Consider first the case of the built-in capital gains tax liability. Suppose the entire gain is realized on the day after the investor buys one share of the fund. If the gain is paid out (the usual case), the investor received 10 on which tax is due. The value of the fund, however, drops from 30 to 20 because of the distribution. If the investor sells his share, he has an offsetting capital loss of 10, and his tax is zero. The same conclusion is reached if the fund reinvests the capital gain and pays the tax on behalf of the shareholder.[9]

Note, however, that to eliminate the tax liability and maintain one's investment, two transactions are necessary each year. A sale is necessary to realize the offsetting loss and a purchase is necessary to restore the initial investment position. Thus two commissions are incurred. In addition,

IRS regulations against wash sales would require a waiting period of 30 days before the share in the same fund could be repurchased. These costs plus the necessary record-keeping costs can be substantial.

Consideration of commission costs alone can imply a substantial discount. Consider a fund that is expected to realize capital gains in every future year and is therefore likely to impose transaction costs in every future year. New York Stock Exchange (NYSE) commissions on an in and out round lot transaction of 100 shares would be on the order of 3% on a $20 stock (the average fund's price). The present value of these costs, if incurred in every future year, would be 30% of the stock price assuming that a 10% discount rate is used. Thus a discount of 30% from net asset value may be warranted simply because of the costs of avoiding adverse tax consequences. Adverse tax consequences would be preferable in those years in which the tax is less than 3%.

In addition to the level of unrealized appreciation in the fund, the market value will depend on the fund's policy with regard to realization.[10] This presumably causes relatively little difficulty for funds with built-in losses. It is easy for such funds to follow an appropriate policy of realizing losses to offset gains. The appropriate policy is less clear for a fund with built-in gains. On the one hand, the fund can have a policy of not realizing gains and thereby postponing the tax liability. But the longer the liability is postponed the more likely it is that it must be incurred. Such a policy also restricts the fund's possible investment strategies. On the other hand, the fund can realize all gains (and losses) keeping low the level of unrealized appreciation and thus minimizing the costs of avoiding future tax liabilities.

These costs are not incurred by a fund with built-in capital losses. Such a fund may realize gains without incurring a tax liability by realizing offsetting losses. Even if no gains are realized, the fund may realize losses that the shareholder may use to offset gains elsewhere in his portfolio. Thus it seems clear that a fund with unrealized depreciation would be preferred by the market over a fund with unrealized appreciation, ceteris paribus.

Several variables are used in an attempt to measure the tax liability effect. The effect of the level of unrealized appreciation is measured by the ratio of unrealized appreciation per share ($U_{i,t}$) to the net asset value per share ($A_{i,t}$): $u_{i,t} = U_{i,t}/A_{i,t}$. The sign on the variable is expected to be negative.

Several different variables are utilized in an attempt to reflect the fund's policy with regard to realization of gains. One variable is the difference between the rate of return on the fund (using net asset value) and the deflated change in unrealized appreciation:

$$X_{i,t} = r^{a}_{i,t} = \frac{U_{i,t} - U_{i,t-1}}{A_{i,t}}$$

The value of this variable would be large for a fund which tends to realize gains and small for a fund which postpones realization. If realization of gains is desirable, the sign on the variable should be positive.
A second variable is a turnover measure. A fund with high turnover must of necessity realize some gains. Turnover is defined as dollar portfolio sales per share divided by net asset value per share: $T_{i,t} = SAL_{i,t}/A_{i,t}$. Turnover may, however, also be a measure of brokerage expenses.

2. Performance

If management has some special talent which is reflected in past performance, funds with superior past performance should sell at a premium while funds with inferior past performance should sell at a discount. The measure of performance used in this study ($g_{i,t}$) is given by[11]

$$g_{i,t} = r^a_{i,t} - \beta_i r^m_t$$

where β_i = is a measure of volatility for the individual fund defined as

$$\beta_i = \frac{cv(r^p_{i,t}, r^m_t)}{\sigma^2(r^m_t)}$$

and estimated using monthly data for the period 1965-1971.[12] Use of β_i was not critical and assuming $\beta_i = 1$ gave substantially the same results. The variable r^a rather than r^p is used because the market return on the fund's share involves changes in the premium or discount, the variable we are attempting to explain.[13]

3. Expenses

If expenses are viewed as a dead-weight loss, producing no shareholder benefits, they should be negatively related to the premium. If they are used to provide net benefits to shareholders, by improving research or by increasing interest in the fund's shares and therefore raising share prices, expenses may reduce the discount or increase the premium. What effect they have is largely an empirical question. The presumption based on studies of mutual funds is that higher expenses are not productive.

The variable utilized in this study is total expense per share $E_{i,t}$ (expressed as cents per share) divided by net asset value per share: $e_{i,t} = E_{i,t}/A_{i,t}$. Expense includes all expenses of managing the fund and providing investment advice. Interest payments are excluded. Brokerage costs are not shown in expense because stock transactions are entered in the fund's book net of commissions.

4. Leverage

In the absence of taxes the implications of the Modigliani and Miller propositions[13] are that leverage should not affect the discount or premium. Shares of two funds with the same net asset value should sell for the same price even if there are different amounts of prior claims. Shareholders of the fund with greater prior claims would face higher risk but would also expect to receive a higher return.

There are tax advantages when interest payments reduce the income tax liability of the firm. Since diversified funds have no income tax liability and since interest payments of the fund do not appear deductible on shareholder tax returns, leverage should, if anything, bring about a discount. That is to say that borrowing by a fund that must meet some or all of its interest costs out of realized capital gains is less desirable than borrowing directly by the fund shareholder. The shareholder would prefer to deduct interest payments against income.

Leverage is given by $l_{i,t} = L_{i,t}/A_{i,t}$, where $L_{i,t}$ = claims prior to common stock (expressed in cents per share).

C. GLOSSARY

(Fund and time subscripts omitted when meaning is clear.)

A = net asset value per share, in dollars

P = price per share, in dollars

I = income dividends per share paid during year, in dollars

C = capital gains dividends paid during year, in dollars

U = unrealized appreciation per share, in dollars

E = total expenses per share, in cents

L = claims on total assets of fund prior to common stock in cents per share

SAL = fund sales per share, in dollars

q = $(P-A)/A$

r^m = rate of return on the S & P Composite Index in percentage points. Dividends excluded.

$$r_t^p = \frac{(P_t - P_{t-1} + I_t + C_t)100}{P_{t-1}}$$

$$r_t^a = \frac{(A_t - A_{t-1} + I_t + C_t)100}{A_{t-1}}$$

β = measure of stock's volatility

u = U/A

$$x_t = r^a - \frac{(U_t - U_{t-1})100}{A_t}$$

T = SAL/A

g = $r^a - \beta r^m$

e = E/A

l = L/A

D. EMPIRICAL RESULTS

Regression analysis was used to test for the existence of a relationship between the premium and the other variables discussed above. All funds were pooled into a single regression. The results are in Table 1. All regressions include as explanatory variables u (unrealized appreciation), e (expenses), l (leverage) and g_t and g_{t-1} (this year's and last year's performance). They differ in other variables used and in the sample of funds included.

In the first regression the influence of unrealized appreciation (u) on the premium is negative as expected but the coefficient is significant only at the .15 level. The related variable used to measure realization policy, x, is however highly significant and positive. This suggests that the market values a large difference between return and change in unrealized appreciation. In other words, the sign on x means that the policy of realizing gains (and losses) is desirable, ceteris paribus. Past performance, g_{t-1} has a positive and highly significant effect on the premium while the influence of this year's performance is not significant. It is not clear why there should be a difference between the two years or, for that matter, why either variable should be significant. There is no evidence that funds which perform well in the past also perform well in the future.[15] The variable 1/A was included to test for the importance of the deflator -- net asset value. It has no separate effect and is not included in later regressions. The coefficients on e and l will be shown to be highly variable and to reflect inter-fund differences.

The second regression includes turnover as a another measure of realization policy. The coefficient of this variable suggests that funds

with high turnover sell at higher premiums or lower discounts. Since high turnover is likely to be associated with a higher rate of realizing gains, this is consistent with the sign on the coefficient of x.

In equation 3 separate intercept terms are entered for each fund to isolate otherwise unexplainable fund differences. That there are firm factors is indicated by the serial correlation of residuals in equations 1 and 2. This is due to the tendency of residuals in the seven years of a single fund to be serially correlated.[16] Inclusion of a firm intercept eliminates this serial correlation. The intercepts tend to be negative which implies that most funds sell at a discount, but only funds 4 and 11 have statistically significant intercepts.

Equation 4 is shown in order to illustrate the effect of omitting x from the regression. The omission raises substantially the significance of u and g_{t-1}. This is the only equation in the table in which the level of unrealized appreciation is significant at the usually required statistical significance levels.

It is questionable whether the use of firm intercepts appropriately isolates the effect of Overseas. In order to avoid the possibility that the results are caused by this rather unique fund, Overseas is eliminated from the sample in regression 5. The effect of expenses and leverage remains insignificant, and the signs of these variables reverse as compared with the preceding regression. (Overseas has high expenses and leverage.) Turnover and the level of unrealized appreciation also become insignificant. The most significant variable is the measure of realization of gains, x. Thus, the hypothesis that realization of gains is desirable from the point

of view of minimizing the discount continues to be supported. The other significant variable is g_{t-1}, "last" year's performance. The sign on this variable continues to suggest that funds with superior performance in preceding years tend to sell at smaller discounts or greater premiums. The negative sign on "this" year's performance is difficult to explain. It may reflect the influence of unrealized gains which are implied by superior performance. But that effect should be captured by x.

Because x is defined in percentage points and q is defined as a decimal number, the coefficient of .0067 implies that an increase of 1% in x results in a .67% decrease in the discount (or increase in the premium). That is, the discount in a year in which x, the difference between total fund return and the increase in unrealized appreciation, was 5%, would be .67% less than in a year in which the value of x was 4%. For a given fund's return, the value of x is maximized when all gains during the year are realized.

E. CONCLUSIONS

In this paper a number of explanations for discounts and premiums on closed-end investment funds have been offered. Two explanations -- tax liability and past performance -- tend to be supported by the data. Funds which do not accumulate unrealized gains as their net assets appreciate tend to sell at lesser discounts than funds which accumulate gains. This appears to reflect the reluctance of investors to purchase funds with a built-in capital gains tax liability. Funds with superior investment performance in the preceding year tend to sell at lesser discounts. This appears to reflect the market's belief (unsupported by the evidence) that past performance is a predictor of future performance. The remaining

variables analysed -- expenses, leverage, turnover and this year's performance are not significant in all regressions and do not appear to have a consistent effect.

FOOTNOTES

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1. Eugene Pratt, "Myths Associated with Closed-End Investment Company Discounts," Financial Analysts Journal, Vol. 22, No. 4 (July-August 1966), pp. 79-82.

2. See footnote 1.

3. I had the benefit of seeing some empirical work by Timothy Kraftson, "Closed-End Investment Companies: Performance, Risk and Discounts," Unpublished Master's Thesis, Wharton School, 1968; and by Stephan Schifter, "Closed-End Investment Companies: Determinants of Discounts or Premiums," Advanced Study Project Paper, May 1971.

4. All funds in this study qualify for IRS "pass through" tax treatment, which means they are not taxed as a separate entity. They do have the option, however, of retaining a capital gain and paying a tax on behalf of the shareholder, or of paying out the gain and letting the shareholder pay the tax directly. In the former case the shareholder receives a credit for the tax paid when he files. The funds are:

   1. Adams Express Co.; 2. Dominick Fund; 3. General American Investor; 4. International Holdings; 5. Lehman Corporation; 6. Madison Fund; 7. Overseas Securities; 8. Surveyor Fund; 9. Tricontinental; 10. U. S. and Foreign Securities; 11. Carriers and General; 12. Niagra Fund.

   All but Overseas are traded on the NYSE.

5. There is some confusion regarding the treatment of the capital gains dividend. The Standard Statistics ISL tapes appear to treat the dividend as a stock dividend. This appears to be incorrect. In most funds the shareholder has the option of receiving cash or additional shares. The proper way to view the distribution is as a cash dividend plus a simultaneous new issue which is less than or equal to the value of the distribution.

6. Prior claims are valued at book.

7. Capital gains dividends for the year t-1 are not usually paid until t.

8. The exclusion of dividends from r^a and r^p does not affect these conclusions. The same regressions were run for the funds taken separately and gave the same result. The average r^2 corresponding to (2) and (3) were .427 and .738 respectively, for example.

9. See Pratt, op. cit.

10. I am grateful to Fischer Black and Morris Mendelson for helpful discussions on this subject.

11. The measure is crude in a number of respects. First, no consideration is given to variations in the risk free rate. Second, the values of β_i used were based on r^p rather than r^a. It is extremely unlikely that these procedures have any significant effect on the results.

12. The values were supplied by the Rodney L. White Center for Financial Research.

13. I am grateful to Marshall Blume for stressing this point.

14. Modigliani and Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," American Economic Review, Vol. XLVIII, No. 3 (June 1958).

15. Significant serial correlation in g_t was observed in 3 funds but in each case it was negative, not positive.

16. Data were arranged so that all years for a single fund were grouped together rather than grouping all funds for a single year together.

Table 1

Determinants of Premiums on Closed-End Investment Funds, Regression Results

Dependent variable = q

		u	e	l	g_t	g_{t-1}	x	T	l/A	Constant or Firm Intercepts						R^2/SE	DW/DF
All Funds	1.	-1.400 (-1.571)	.0991 (2.049)	.4773 (1.531)	.0023 (1.041)	.0101 (3.626)	.0095 (3.268)		-.4998 (-.823)	-.1627 (-2.601)						.6755 .1573	1.2149 77
	2.	-.0585 (- .920)	.0958 (2.653)	-.5284 (-1.928)	-.0029 (-1.593)	.0059 (2.711)	.0093 (4.165)	.2487 (7.465)		-.2009 (5.773)						.8111 .1201	1.4176 77
	3.	-.1934 (-1.225)	-.0327 (-.530)	-.0496 (-.144)	-.0033 (-1.638)	.0049 (2.295)	.0063 (2.848)	.1989 (3.9428)		1) -.0272 (- .324)	5) .0959 (.935)	9) -.0952 (-1.008)				.8703 .0995	1.9035 66
										2) -.1362 (-1.522)	6) -.0070 (-.091)	10) -.0681 (- .509)					
										3) .0059 (.053)	7) .1373 (.427)	11) -.1814 (-4.469)					
										4) -.2450 (-3.406)	8) -.1043 (-1.426)	12) .0051 (.052)					
	4.	-.3275 (-2.065)	-.0953 (-1.572)	.3085 (.916)	-.0017 (- .828)	.0074 (3.704)		.1892 (3.571)		1) .0830 (1.507)	5) .2238 (2.304)	9) -.0085 (- .090)				.8563 .1047	1.8018 67
										2) -.0182 (- .218)	6) .0663 (.871)	10) .1002 (.794)					
										3) .1444 (1.361)	7) .1757 (.520)	11) -.1627 (-3.861)					
										4) -.2034 (-2.743)	8) -.0270 (- .387)	12) .1227 (1.310)					
Without Overseas	5.	.0422 (.206)	.2594 (1.039)	-.5867 (-1.312)	-.0034 (-1.571)	.0046 (2.096)	.0067 (2.724)	.1721 (.963)		1) -.2491 (-1.411)	5) -.1251 (- .712)	10) -.4060 (-1.509)				.5658 .0981	1.7425 59
										2) -.3481 (-1.924)	6) -.1197 (- .738)	11) -.2166 (-4.682)					
										3) -.3082 (-1.202)	8) -.2759 (-1.731)	12) -.2519 (-1.247)					
										4) -.3576 (-2.452)	9) -.2391 (-1.700)						

Note: Numbers in parentheses are t values. R^2 = coefficient of determination. SE = standard error. DW = Durbin-Watson statistic. DF = degrees of freedom.