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Are the Discounts on Closed-End Funds a Sentiment Index?

NAI-FU CHEN, RAYMOND KAN, and MERTON H. MILLER*

IN “Investor sentiment and the closed-end fund puzzle,” Charles Lee, Andrei Shleifer, and Richard Thaler (1991) claim to solve not one, but two, long-standing puzzles—discounts on closed-end funds and the small firm effect. Both, according to Lee *et al.*, are driven by the same waves of small investor sentiment. Killing two such elusive birds with one stone would be a neat trick indeed if Lee *et al.* could bring it off. But they can’t. Measured properly, the comovement between fund discounts and small firm returns is neither strong enough, nor robust enough to support their common sentiment story.

The case of Lee *et al.* rests mainly on their key Table IV in which monthly returns for 10 separate size-grouped portfolios are regressed on monthly changes in the discount of a value-weighted portfolio of closed-end funds (ΔVWD) and the monthly return on a value-weighted portfolio of NYSE firms (VWNY). For their twenty-year sample period running from July 1965 to December 1985, Lee *et al.* find changes in the value-weighted discount, holding market returns constant, to be positively related to the returns of the largest firms (decile 10), but negatively related to those of all other size deciles. The negative coefficient is largest for the very small firms in decile 1, leading Lee *et al.* to conclude that when “individual investors become optimistic about closed-end funds and smaller stocks, these stocks do well and discounts narrow.” And “when individual investors become pessimistic about closed-end funds and smaller stocks, smaller stocks do badly and discounts widen” (pp. 94–95).

Could the observed relation between fund discounts and small firm returns be just a chance sampling fluctuation? Lee *et al.* checked for robustness by dividing their sample in half and rerunning their regressions on each half separately (their Table VII). They found the coefficient of ΔVWD in the decile 1 regression dropped in the second subperiod by 80 percent; and, in absolute size, fell to barely one standard error from zero. Similar attenuation in size and significance was noted for all other size groups.

The virtual disappearance of the relation between the discounts and small firm returns after 1975 might have led other researchers to abandon a common sentiment hypothesis. But not Lee, Shleifer, and Thaler. They see

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their robustness tests not as refuting, but as *supporting* their interpretation. Between 1980 and 1988, they note, institutional holders more than tripled their percentage holding of first decile firms. Consequently, "individual investor sentiment, which continues to be reflected in the discounts of closed-end funds, is no longer as strongly reflected in the pricing of smaller stocks" (p. 99).

To confirm this supposition, Lee *et al.* constructed a new sample consisting of all NYSE firms with less than 10 percent institutional ownership as of 1985—a sample whose ownership structure is similar to that of closed-end funds. They show in their Table VIII that the linkage between the fund discounts and the returns on this sample of firms with low institutional holdings remains strong even during the disputed 1975 to 1985 half sample.

Their new test is needlessly indirect, however, and risks confounding institutional ownership with other, possibly special properties of their low-institutional sample. More than two thirds of that sample, they concede, consists of public utility firms. And when we tested a portfolio of NYSE public utility firms with *more* than 10 percent institutional ownership, our results were essentially the same as for their sample with *less* than 10 percent ownership.

To isolate any purely institutional ownership effect, therefore, we prepared the much more direct test shown in our Table I, by dividing the small firms of decile 1 into two subportfolios: those small firms with less than 10 percent institutional ownership as of the end of the previous year; and those with more than 10 percent institutional ownership. If fund discounts are a "sentiment index" for small firms with little institutional ownership, then our two subportfolios ought to behave quite differently. For low-institutional firms, the connection between fund discounts and returns should be strong in both periods; and for the other firms, it should be weak in both periods.

Table I shows, however, that for our low-institutional sample, the coefficient of the decile 1 size class drops by 58 percent in the second subperiod and can no longer be considered reliably different from zero. But the coefficient for decile 1 shows up strongly in the first subperiod even for the subsample of firms that *did* have more than 10 percent institutional ownership. In fact, no difference in the response of discounts on closed-end funds to small firms with less than or with more than 10 percent institutional ownership can reliably be detected in the data.¹ So much then for the common-structure-of-ownership amendment to the investor sentiment story of Lee *et al.*²

¹ A caveat must be entered, however. Our cutoff refers strictly to institutional holdings whereas Lee *et al.* refer to institutional holdings *plus* large block holdings.

² That institutional ownership should play no meaningful role is hardly surprising in the light of other studies of closed-end fund discounts. Ammer (1990), for example, points out that the British closed-end funds go through periods of discount and premium similar in most respects to U.S. funds. Yet the clientele of the British funds is and always has been almost entirely institutional. Sentiment waves generated by small or unsophisticated investors are thus clearly not critical to the emergence of a closed-end fund puzzle.

Table I
Time Series Relations between Returns of Firms in the
Smallest Size Decile, the Market Return, and Changes in
Closed-End Fund Discounts

The table presents the monthly regressions of monthly equally weighted returns on two different portfolios, respectively, on monthly changes in the discount on a value-weighted portfolio of closed-end fund discount (ΔVWD), and the monthly returns on a value-weighted index of the NYSE (VWNY) for the entire period (1965/7 to 1985/12) and two subperiods. The two portfolios are (i) firms in the smallest size decile of the NYSE with 10 percent or less institutional ownership, and (ii) firms in the smallest size decile of the NYSE with more than 10 percent institutional ownership. The composition of the portfolios are revised every year at the beginning of the year based on the institutional ownership of the firms at the end of previous year as reported in the January issues of *Standard and Poor's Stock Guide*. *t*-Statistics (adjusted for conditional heteroscedasticity) are shown in parentheses.

Panel A: Small Firms with Not More Than 10% Institutional Ownership				
Period	Constant	ΔVWD	VWNY	R^2
1965/7–1985/12	0.0067 (2.23)	–0.473 (–2.87)	1.263 (11.66)	0.540
1965/7–1975/9	0.0072 (1.56)	–0.618 (–2.48)	1.337 (8.72)	0.569
1975/10–1985/12	0.0074 (1.75)	–0.257 (–1.18)	1.174 (7.50)	0.505
Panel B: Small Firms with More Than 10% Institutional Ownership				
1965/7–1985/12	0.0042 (1.15)	–0.687 (–3.58)	1.232 (10.26)	0.456
1965/7–1975/9	0.0042 (0.70)	–0.818 (–2.99)	1.267 (7.60)	0.433
1975/10–1985/12	0.0049 (1.14)	–0.494 (–1.77)	1.187 (6.44)	0.493

Using a paired *t*-test, the equality of the coefficients of ΔVWD for the two portfolios cannot be rejected at the 5 percent level. The *p*-values of the paired *t*-test for the entire period and two subperiods are 0.09, 0.18, and 0.27, respectively.

But why bring small firms into the fund discount story at all? The smallest firms are actually no more strongly related to closed-end fund discounts than are firms in other size classes. And the ties to the discounts are hardly noteworthy for any of them, though their critical Table IV makes that needlessly hard to see. The tenuous connection between fund discounts and the returns of the various size portfolios becomes apparent, however, once the decile returns are shifted to the right-hand side of each regression among the independent variables and the value-weighted discount is put on the left as the variable to be explained. The explanatory power of the regressions with different size portfolios, as measured by R^2 , can then be compared directly because the regressions will have the same dependent variable. Further insight into the strength of the discount-size-of-firm connection can be gained by restating the discount in rate-of-return form as the difference

between the value-weighted return on the funds' shares and the value-weighted return on the funds' net asset value. Moving the net asset value to the right-hand side then shows how much of the return on closed-end fund shares reflects the "fundamentals" of net asset value, and how much additional explanatory power is associated with the returns on the various size groups.

The key terms, rearranged in this more revealing form, are presented in our Table II.³ The return on net asset value explains most of the return on closed-end fund share prices (72.8 percent) but not all of it. That, in an important sense, after all, *is* the closed-end fund puzzle. But how much of that puzzle is resolved by looking to the return experience of firms in particular size groups? The answer, judging from the remaining rows in Table II, is very little. The marginal contribution of the firm size variables, given net asset value, is nowhere more than 4 percent of the variance in closed-end fund returns.⁴ Nor are the marginal gains consistently higher for small firms than for mid-cap or even some large-cap stocks. Note, moreover, that the small firm effect, in the sense of the difference in returns between large (decile 10) and small (decile 1) firms actually accounts for slightly less of the variance in closed-end fund returns than does the return on the mid-cap firms of decile 6; and it accounts for only trivially more than the returns on the firms of decile 8, which are far from small cap.⁵

By making the real marginal contribution of the size variables easier to see, inverse regressions in the spirit of our Table II also undermine such additional support for their common sentiment contention as Lee *et al.* seek to draw from the case of TriContinental Corporation in their Tables V and VI. They note, with some satisfaction, that "smaller stocks do well when TriCon's discount narrows even though TriCon is holding virtually no small stocks" (p. 99). But how strongly are returns on TriCon's own shares really related to those of small firms subject supposedly to the same waves of small investor optimism and pessimism? Our Table III suggests not particularly strongly at all, once account is taken of returns of the size classes in the range of TriCon's own major holdings. Given the returns of just deciles 8 and 10, for example, the marginal explanatory contribution of small firm returns to TriCon's returns turns out to be negligible for the entire period and both subperiods.⁵

In sum, we reject as unfounded the central claim of Lee *et al.* that "The evidence suggests that discounts on closed-end funds are indeed a proxy for changes in individual investor sentiment and that the same sentiment affects

³ To avoid clutter, our table presents the results only for the entire sample period.

⁴ Brauer (1992) also provides confirming evidence of our upper bound by showing that no more than 4 percent of the variance of the closed-end fund discounts could be due to "noise trading."

⁵ For the record, let it be noted that we have also replicated for TriCon the test format of our Table II. Regressing TriCon's own share returns on TriCon's net asset value, and, successively, the returns of the size class deciles yields results no more favorable to Lee *et al.*'s common sentiment hypothesis than those of Table III. In fact, the added explanatory power of the decile 1 firms is smaller than for all other size deciles through decile 9.

Table II
The Time Series Relations between Returns on Share Price of Closed-End Funds, Returns on Net Asset Value of Closed-End Funds, and Returns on Size Decile Portfolios over 1965 / 8 to 1985 / 12

The table presents the monthly regressions of monthly value-weighted returns (with dividends) of share prices of a portfolio of closed-end funds (RSP) on monthly value-weighted returns (with dividends) of net asset value of the corresponding closed-end funds (RNAV), and different value-weighted size decile portfolios of the NYSE (DECI):

$$RSP_t = \beta_0 + \beta_1 RNAV_t + \beta_2 DECI_t + \varepsilon_t$$

where DECI is the i th size decile portfolio as indicated in the first column of the table. The first model is without the independent variable DECI. The last model uses the difference between the returns of DEC1 and DEC10 as the independent variable DECI. t -Statistics (adjusted for conditional heteroscedasticity) are shown in parentheses.

i	Constant	RNAV	DECI	R^2
1-10	0.002 (1.51)	0.957 (26.35)		0.728
1 (smallest)	0.001 (0.96)	0.757 (13.68)	0.157 (5.73)	0.760
2	0.001 (1.03)	0.700 (11.89)	0.208 (6.31)	0.763
3	0.002 (1.11)	0.688 (10.41)	0.218 (5.46)	0.758
4	0.001 (1.03)	0.615 (8.91)	0.288 (6.34)	0.768
5	0.002 (1.17)	0.620 (8.20)	0.285 (5.71)	0.761
6	0.002 (1.18)	0.591 (7.63)	0.319 (5.86)	0.763
7	0.002 (1.42)	0.601 (6.86)	0.309 (4.81)	0.754
8	0.002 (1.35)	0.588 (5.75)	0.360 (4.88)	0.756
9	0.002 (1.65)	0.548 (5.05)	0.381 (4.22)	0.752
10 (largest)	0.002 (1.59)	0.845 (7.43)	0.122 (1.06)	0.730
1-10	0.001 (0.48)	0.913 (23.52)	0.124 (4.70)	0.752

returns of smaller capitalization stocks and other stocks held and traded by individual investors" (p. 107). A closer look at their data finds the returns of smaller capitalization stocks not strongly related to closed-end funds in any absolute sense and not substantially more strongly so than are the returns of most larger capitalization stocks. The relations between closed-end funds and size-based portfolios, moreover, are highly sensitive to the particular months included. The virtual disappearance of Lee *et al.*'s supposed common senti-

Table III
Time Series Relations between Returns on Share Price of
TriContinental and Size Deciles 1, 8, and 10

The table presents the monthly regressions of monthly returns of the share price of TriContinental on monthly returns of size deciles 1 (DEC1), 8 (DEC8), and 10 (DEC10) of the NYSE for the entire period (1965/7 to 1985/12) and two subperiods. *t*-Statistics (adjusted for conditional heteroscedasticity) are shown in parentheses.

Period	Constant	DEC1	DEC8	DEC10	R^2
1965/7–1985/12	0.0027 (1.14)	0.015 (0.22)	0.564 (3.18)	0.279 (1.76)	0.546
1965/7–1975/9	0.0017 (0.49)	0.062 (0.60)	0.486 (1.92)	0.254 (1.06)	0.502
1975/10–1985/12	0.0033 (1.11)	–0.047 (–0.54)	0.670 (2.86)	0.287 (1.52)	0.598

ment connection in the second half of their sample is attributed by them to the rise in institutional holdings of small stocks after 1975. That rationalization, however, is not convincingly supported by their own additional data on institutional holdings and is flatly contradicted by ours.

The profession, we fear is thus left with the same two puzzles it had been confronting before the attempt of Lee *et al.* to reconcile them. Oh, well. Back to the old drawing board!

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