

Protecting Fund Shareholders from Costly Share Trading

Gary L. Gastineau

Early in September 2003, Eliot Spitzer, New York State's attorney general, announced a \$40 million settlement with a hedge fund that had allegedly engaged in "late trading" and "market timing" with mutual funds. In what Spitzer and the media defined as "late trading," the hedge fund had been permitted to buy and sell fund shares at the fund's 4:00 p.m. net asset value (NAV) several hours after the prices used in the NAV calculation were determined—a violation of U.S. SEC Rule 22c-1. Distinct from the transactions at "backward" prices were a number of market-timing trades initiated at or slightly before 4:00 p.m. In some cases, these trades may have taken advantage of "stale" prices in foreign or illiquid markets. In many cases, the market-timing trades created a need for the fund to trade during the following day's trading session. Any market impact cost of the next-day trades was borne by all the fund's shareholders.

I expect further investigation to confirm that illegal backward pricing of fund share transactions—that is, late trading—is rare.¹ Unfortunately, there is strong evidence, apart from the recent publicity, that fund share orders coming to a fund late in the day are common. These orders come from investors with motives far more diverse than market timing over a few days.

Since the Spitzer settlement called attention to these practices, the emphasis of most regulators and pundits has been on preventing improper trades based on stale prices or executed in violation of prospectus prohibitions against market timing. Stopping these abuses is important, but the abuses cited are possible only because the standard mutual fund pricing and trading processes are inherently flawed. The investor outrage thus offers an opportunity to make changes that will fix more costly problems than the scandal itself has uncovered.

The simple fact is that most fund share trades that arrive late in the day are costly to existing fund shareholders no matter whether they were initiated

by short-term traders or by ordinary investors. Published estimates of the cost to shareholders of fund orders entered at or just before the market close range from trivial levels to \$5 billion a year (Zweig 2003; Zitzewitz 2003a). These estimates generally apply to the *profits* earned by market-timing traders. In contrast, the estimates developed in this article recognize that orders the fund does not receive by early afternoon cost fund shareholders much more than simply the profits that some traders take away.² I estimate that the fund shareholders' performance penalty from late-afternoon trading is about \$40 billion, or 1 percent of equity fund assets, each year.

The purposes of this article are (1) to help investors and regulators understand how costly the current trading and pricing process is to shareholders in mutual funds and (2) to persuade readers that fund share transactions received after 2:30 p.m. should be priced at the next day's 4:00 p.m. NAV.

Costly Trades

Last-minute fund buy orders frequently arrive on days when the market is strong near the close. A trader cannot buy the stock positions held by a typical equity fund at 4:00 p.m. prices by entering stock buy orders at 3:59 p.m. The trader can, however, buy shares in most funds a few seconds before 4:00 p.m. Just as a trader cannot execute stock trades right before the NAV calculation, the fund cannot make an immediate trade for its portfolio to invest the new cash. Whether they intend to get in and out quickly or to stay for years, many buyers of fund shares make last-minute purchases on days with a strong market at the close. If they capture market momentum, their trades are particularly costly to their fellow fund shareholders because the fund will have to buy stocks at even higher prices on the next trading day to invest the cash inflow. Correspondingly, if a shareholder redeems fund shares with an order entered near 4:00 p.m., the fund will have to sell portfolio securities the next trading day, often at lower prices, to cover the redemption. The fund is thus providing free liquidity for these investors, and the fund's shareholders pay the cost of that liquidity.

Gary L. Gastineau is a managing director at ETF Consultants, Summit, New Jersey.

Cost of Providing Free Liquidity

Studies of the impact of fund share trading offer compelling evidence that the costs to ongoing (non-trading) shareholders of providing free liquidity to trading shareholders are substantial. Roger M. Edelen (1999), at the time a professor at the Wharton School at the University of Pennsylvania, quantified the adverse effect of shareholder entry and exit costs on fund performance. Using a sample of 166 conventional (no-load) funds ranging in type from small-capitalization to income funds, Edelen examined all purchases and sales of securities by the funds over a series of six-month periods.³ The six-month interval was determined by the traditional reporting interval for mutual funds.⁴ Edelen broke down each fund's trading into flow (fund share turnover) and nonflow (portfolio composition changes) components. He measured how much of the flow-related trading was incremental trading resulting from the need to purchase and sell portfolio securities in response to the entry and exit of shareholders. His methodology revealed the cost of the trading, not the motives of the buying and selling shareholders. Edelen did not attribute a performance cost to flow trading if the manager was able to use the flow to make desired portfolio changes. He concluded that for the average fund in his sample, 30 percent of the flow into and out of the fund did not result in incremental trading and about half of the fund's total trading was flow related.

If 70 percent of flow resulted in incremental trading, then about 35 percent of total fund trading was incremental trading that resulted from providing liquidity to entering and leaving shareholders. The average fund Edelen studied was clearly not used aggressively by fund traders; aggressive trade timing can easily cause a rate of annual portfolio turnover of several hundred percent.⁵ The modest fund share turnover in Edelen's sample notwithstanding, the trading costs he attributed to the liquidity offered to entering and exiting shareholders accounted for an average *net* reduction in annual investor return of about 1.43 percent—not materially less than the average mutual fund's expense ratio.⁶

The 1.43 percent cost of providing liquidity to buyers and sellers of fund shares is the source of my \$40 billion estimated performance cost of late-afternoon fund share orders.⁷ Evidence that mutual fund trading costs may have changed materially since the period of Edelen's study (primarily because of pricing decimalization) is contradictory,⁸ but if one allows for the possibility that trading costs may have declined, the liquidity cost calculation is simple.⁹ The latest available figures show assets in

U.S. stock and hybrid funds at about \$4 trillion. Applying a conservative cost of providing liquidity of just 1 percent produces a \$40 billion estimate.

A small number of funds that are intensely protective of their shareholders have succeeded in eliminating the impact of these trading costs and may even earn a small profit for the fund on share turnover. The protective funds do this simply by cutting off buy, sell, and exchange orders for fund shares early in the afternoon. They trade for the fund portfolio before the market close, so the cost of flow trading is reflected in the NAV calculation that prices the shares for entering and leaving shareholders. If all funds had these protective policies, fund investors' returns might improve by more than \$40 billion a year.

Possible Solution

A possible solution to the free-liquidity problem is based on a framework consisting of three policy changes:

1. For domestic equity or balanced funds, any open mutual fund (one that is accepting new investments) would accept purchase orders and all redeemable funds would accept redemption orders delivered to the advisor until 2:30 p.m. on any normal business day (a different cutoff time would apply on days with early closings) for pricing *at that day's NAV*. No order cancellations would be permitted after 2:30 p.m., and the fund could trade to adjust its portfolio for these investor orders before the market close.
2. After 2:30 p.m., market makers unaffiliated with the fund advisor would be able to provide liquidity to investors who wanted to enter an order for execution at a share price *based on that day's NAV*.
3. For funds holding more than 3 percent of their assets in stocks traded in one or more primary markets outside the United States, orders would be accepted until 4:00 p.m. on any U.S. business day for pricing at the NAV next determined for the fund *after a full trading day* in the primary markets for stocks accounting for 97 percent of the fund's equity portfolio.

I elaborate on these proposals in the following sections and discuss how to accommodate investors with special needs and fund exchange practices that are not fully consistent with this simplified statement of the framework.¹⁰

The SEC and others have proposed a variety of compliance rules, disclosure requirements, and changes in fund operating and marketing policies. I refer here to such proposals when appropriate but

spend little time on proposals directed at abuse detection and rule enforcement. Such changes are inevitable and, on balance, useful, but the emphasis in this article is on creating a framework that removes much of the incentive and opportunity to abuse fund shareholders. Most of the proposals I discuss at length share the framework orientation. The proposed framework will make the other reforms more effective.

Order Cutoff Time. Early order cutoff has not been on most of the widely publicized lists of proposed cures for mutual fund problems, but not surprisingly, a 2:30 p.m. cutoff time is on the list of John Bogle, founder of the Vanguard Group. An early-cutoff approach arises from seeing the problem not simply as a market-timing problem but as a flawed mechanism for fund share purchase, sale, and pricing that invites abuse of ongoing shareholders. A proposal that requires a fund to receive orders to buy and sell fund shares, price the shares, and trade to balance the portfolio instantaneously and simultaneously at 4:00 p.m. is impractical. It cannot be done. The 4:00 p.m. cutoff endorsed by the Investment Company Institute (ICI) and the SEC would continue to give free liquidity to the fund share trader who enters an order just before 4:00 p.m. This liquidity is costly in the aggregate to the ongoing fund shareholders who provide it.

Redemption Fees. The mutual fund redemption fees under discussion in connection with fund reform apply only to round-trip trades completed within a short period. Advocates with perspectives as diverse as those of Bogle, the SEC, and the ICI have endorsed redemption fees to discourage short-term traders. The SEC and the ICI propose a minimum redemption fee of 2 percent for positions closed out within five days. Bogle agrees with the 2 percent fee but proposes that it be imposed on any sale within 90 days. The SEC and ICI proposals would make the fees mandatory for most funds.¹¹ Little support exists for a mandatory redemption fee level other than 2 percent or for a cutoff date less than 5 or more than 90 days after the fund share purchase. Several funds are already collecting similar fees in an attempt to discourage traders or, alternatively, to compensate ongoing shareholders for the fund's cost of providing liquidity to traders.

Redemption fees probably do little harm, and they will at least discourage some market timers.¹² But market timers account for a relatively small proportion of trades arriving after 2:30 p.m. Furthermore, redemption fees are, at best, a crude approximation of the liquidity cost traders impose on a fund's ongoing shareholders. The cost of the

fund's portfolio trading to accommodate all fund share trading (by short-term and long-term investors) can become a *permanent* cost to other shareholders. This happens when a fund share trader avoids the redemption fee by staying in the fund past the redemption fee cutoff date. In short, redemption fees will not solve the problem of liquidity costs for most fund share transactions.

Fair Value Pricing. In calculating its current NAV, a fund is generally required to price its portfolio securities on the basis of readily available market quotations. If market quotations are not readily available for a particular security or group of securities, the fund is encouraged to value securities at their fair value. Fair value is determined by or under the direction of the fund's board of directors.

A fund must consider *but is not required to adopt* fair value pricing of portfolio securities traded on a foreign exchange. On a number of occasions, most famously in October 1997, speculators have purchased shares in open-end funds that held extensive positions in foreign securities. The speculators were dismayed to find that some funds had used fair value pricing, thus depriving the traders of what they thought was their rightful opportunity to benefit at the expense of fund shareholders. In fact, the funds were simply meeting their pricing obligation effectively.

Fair value pricing raises little controversy today, although as Bogle has pointed out, it has a weakness: "The difficulty with fair pricing always was and is that you can't always assume good intentions" (Strauss 2003, p. F3). If we assume good intentions, or if a fund holding foreign securities uses a third-party regression model (see Ciampi and Zitzewitz 2003; Zitzewitz 2003a; Madhavan 2003) to make a low-cost fair value calculation, pricing foreign stock funds is relatively simple. My proposal to defer pricing of transactions for foreign stock fund shares until the foreign market has traded for a full day is less costly and more objective than fair value pricing. The proposed approach uses deferred actual prices from the foreign market, not projected prices. More important, the next day's closing prices in the foreign market will be affected by any trades the fund makes on that day to reflect cash flow into or out of the fund.

Fair value pricing is not essential for most foreign stock funds, but it is essential for certain illiquid or infrequently traded positions. Among domestically traded securities in the United States, fair value pricing is most useful for microcap stocks and for bonds.

With a 2:30 p.m. cutoff, the portfolio manager has the opportunity to invest money coming in or to liquidate positions to cover redemptions at contemporary prices. Moreover, the fund's trades between 2:30 p.m. and 4:00 p.m. will affect and help update the prices used in the NAV calculation. To the extent that a 2:30 p.m. order cutoff encourages more trading in domestic securities in the last hour or so before fund pricing, the prices used in the NAV calculation will be more current and fair value pricing will be less necessary.

None of the other proposals circulating, including fair value price calculations based on less-than-current prices, will solve as many problems as (or solve *any* problems as well as) the 2:30 p.m. order cutoff and its companion proposals. If portfolio managers have the opportunity to achieve their portfolio composition objectives before the NAV is calculated, the fund should have updated prices determined after 2:30 p.m. for any portfolio securities purchased or sold by a manager late that day. This outcome is a great improvement over having to purchase or sell securities at prices determined the next day to accommodate a net cash flow that entered or left the fund at today's (possibly stale) closing prices.

Viewing fund share trading in terms of price discovery is also useful. The hedging transactions of market makers and same-day portfolio transactions by a fund to equitize fund share purchases and sales contribute to stock price discovery. Fund share orders that a fund cannot translate into portfolio trades before the market close do not contribute to price discovery on that day. If fund share orders are priced at an NAV that is unaffected by the change in fund asset levels that the orders represent, the process of fund share trading distorts closing share prices and increases probable shareholder dilution.

Rejecting Orders from Market Timers.

Many fund advisors state with varying degrees of pride, determination, and conviction that they have policies to limit the frequency of fund share trading. Some claim to have effective monitoring to reduce fund share turnover linked to short-term trading. Under proposals from the SEC, such policies will be more deeply embedded in prospectus language and monitored by a new independent compliance group at each fund family. This increased attention will certainly discourage market timers at some funds. It is not clear, however, that these policies will be effective at all funds. Inevitable unevenness in enforcement may simply encourage traders to go elsewhere rather than reduce market timing in the aggregate. Funds with expensive trade-monitoring

and -control procedures will incur costs to protect their shareholders—costs that could be avoided with the 2:30 p.m. cutoff and, perhaps, a mandatory redemption fee.

Last-minute purchases and redemptions will remain an issue under a 4:00 p.m. hard close because (under SEC Rule 22c-1) a fund is required and will continue to be required to accept orders until 4:00 p.m. unless it has language in its prospectus that permits an earlier cutoff of certain types of orders. A prospectus may permit the fund to reject or defer pricing of orders that will have an adverse effect on the fund. In practice, even the most conscientious fund finds it difficult to reject such orders—at least until a clear “market-timing” trading pattern has been established. Most funds consider accepting orders until just before the market close to be part of their commitment to investor service. If an order turns out to be from a market timer, the fund may refuse future orders, but funds rarely reject the first order anyone enters at 3:59 p.m. And, of course, a market timer who is turned away may come back under a new identity on another day. In the final analysis, as long as the SEC's cutoff for fund purchases and sales is 4:00 p.m., most individual fund policies will do little more than divert timing transactions to fund groups with less stringent control of their trading turnover and transaction timing. Policies against timing will not protect fund shareholders from the cost of trades by investors who are not classified and excluded as market timers.

Fund Advisor Motivation. Clearly, many fund families—notwithstanding statements in their prospectuses—have not discouraged traders. Some observers argue that fees earned on additional assets are a strong incentive to accept last-minute orders. Zitzewitz (2003a) estimated the present value of future fees at \$0.20 per \$1.00 of *reduced* shareholder dilution. If his analysis is correct, timers are clearly having an adverse effect on long-term growth in assets and management fees because timer trading dilutes performance. The problem with this analysis is that the manager cannot be sure which trades create nothing but dilution and which trades bring in “permanent” assets. Even new permanent assets dilute prior investors on balance. Indeed, most things the fund manager does to bring in new assets create a conflict with the interests of existing holders when the fund has a 4:00 p.m. order cutoff.

An associate and I made calls to a number of mutual fund companies' 800 numbers in early 2002, and we found most of them eager to accept trades in their funds until 3:59 p.m. each trading day.¹³

The behavior of some fund advisors in facilitating late trading and market-timing trades in conflict with their prospectus language is disturbing. It suggests that the conclusion some management companies or their employees have reached is that permitting market-timing trades can be in their *personal* best interest. The fact that some of the recently disclosed decisions were made below the top management level also reveals conflicting objectives. The conclusion is inescapable that only a market framework that makes perfidy extremely difficult will prevent future trading abuses. More importantly, correctly identifying the motivation behind each transaction and rejecting timing orders will not eliminate the performance penalty inherent in a 4:00 p.m. order cutoff.

Zitzewitz (2003a) clearly described and evaluated most of the proposals and combinations of proposals that have been made to protect shareholders from stale prices and late-arriving orders. A mandatory industry standard for order cutoff times earlier than 4:00 p.m., however, is a solution that Zitzewitz (2003a) did not consider. He viewed the problem more narrowly than seems appropriate now. He asserted:

So long as inflows and outflows are roughly balanced and not opportunistically timed, mutual funds can match buy and sell orders internally and provide zero-transaction-cost liquidity without significantly altering their holdings or trading themselves. (p. 265)

As he recognized, these conditions are often not met. Edelen's data indicate that approximately 70 percent of flow trading is a net mismatch. As a consequence, any solution that does not involve a cutoff well before 4:00 p.m. for domestic funds and effective changes for foreign funds will leave mutual fund shareholders vulnerable to abuse.

Funds That Protect Shareholders

Concern for the performance impact of late-arriving cash purchases and sales of fund shares prompted me to look at funds not seriously affected by this issue:

1. exchange-traded funds (ETFs) that create and redeem fund shares by the in-kind exchange of portfolio securities for fund shares and
2. conventional funds that effectively cut off cash purchases and sales earlier in the day.

ETFs. Each ETF shareholder pays his or her own fund entry and exit costs, either as part of the in-kind process of fund share creation and redemption or simply by paying a market-determined price to buy or sell ETF shares in an open market

trade with another shareholder or a market maker. The creation-and-redemption baskets the fund accepts or delivers in exchange for fund shares are typically identical in composition to the fund. In-kind exchanges eliminate the issue of fair value pricing even for funds holding non-U.S. stocks. In-kind contributions or redemption proceeds are priced by using the same securities prices used to calculate the fund's NAV. Once an ETF shareholder pays the transaction costs to enter the fund, *no* meaningful further entry or exit costs penalize the ETF shareholder's performance until that shareholder sells his or her shares. The stock market provides liquidity to the ETF share trader, and the trader pays for that liquidity. The significance of this difference between ETFs and conventional funds is that, other things being equal, an ETF should outperform a comparable conventional fund that accepts cash orders until 4:00 p.m. The expected magnitude of the outperformance will be the conventional fund's cost of providing liquidity to entering and leaving shareholders.

An ETF manager does not have to worry (in the way a conventional fund manager worries) about a timing mismatch with orders received at or near the market close. ETFs do, however, face a special problem with late in-kind purchases and sales if the ETF is trading to make changes in its portfolio composition without revealing the portfolio changes in advance. When creations or redemptions are made by using baskets that match the "old" portfolio, a creation will change the end-of-day composition of the portfolio partly back in the direction of the old portfolio. In the case of redemption, delivering a basket that matches the old portfolio will exaggerate the composition change. If the creation-and-redemption baskets *for the next day* are changed to reflect the new portfolio composition objective, the portfolio manager usually can get to the desired portfolio composition with a small trade on that day. In contrast to the net 1.43 percent estimated average cost of providing liquidity that Edelen found, the cost of these adjustment trades is estimated to range from a few basis points for a large-cap index fund to perhaps 10 bps for an actively managed ETF with daily portfolio disclosure.¹⁴ Unfortunately, this feature of ETFs also appears to inhibit appropriate portfolio modification by index ETF portfolio managers, which weakens their shareholders' performance (see Gastineau 2004a for an explanation and examples).

The solution to this ETF problem is simply to require earlier commitment to creations and redemptions. Portfolio managers should know whether they will face creations and/or redemptions by 2:30 p.m. on any normal trading day.

Enough transactions can be held until late afternoon to assure that the fund's late-day trades will get the portfolio, adjusted for in-kind creation-and-redemption baskets, to the composition the manager is seeking.

Conventional Funds with Restrictions.

Some mutual funds avoid late-day cash purchases and sales of fund shares almost entirely—simply by blocking or deferring most late-afternoon orders. A number of fund groups use this approach, but the most prominent, vocal, and transparent example, at least until recently, has been Vanguard. Vanguard is in the process of changing its policy on late orders and late-day shareholder exchanges between Vanguard funds. So, I will describe the “traditional” Vanguard process first and then evaluate the announced modifications.

Vanguard had protected its index fund shareholders from share-trading costs by a process that, in effect, gave Vanguard portfolio managers early notice of cash purchases and sales of fund shares. This information let the manager enter orders to buy or sell portfolio securities before the market close, thereby accommodating fund share purchases and sales at little—or even negative—cost to ongoing shareholders.

Vanguard's traditional shareholder protection system is intriguing. To appreciate its elegance and effectiveness, the reader needs to understand that large investors can enter an order to buy or sell a stock at the market closing price or better for *no commission* as long as the broker has some time to try to make the trade at a better price than the close.

An institution using market-on-close-or-better orders will trade at no apparent cost. If the broker executes a fund's trade at a price that is better than the closing price used in the NAV calculation, the fund may share the benefit of the better price and earn a small profit for its shareholders relative to the closing price.¹⁵ To give brokers time to work orders before the close, a fund needs to know its net cash flow by early afternoon. To this end, Vanguard did not accept interfund exchange instructions after 2:30 p.m. for international and index funds. Under this policy, an investor could not initiate a same-day transfer of assets from a Vanguard money market fund to a Vanguard equity index fund (or vice versa) after 2:30 p.m. The exchange cutoff time was particularly important because most orders to buy or sell Vanguard funds that could be entered after 2:30 p.m. were fund exchanges.¹⁶

Vanguard technically accepts mail orders until the market close, but mail orders go to post office boxes, so there is obviously a time when Vanguard stops collecting and opening mail for the day. Van-

guard apparently follows industry practice in giving 401(k) plan investors the closing price on the day an order is entered even if Vanguard does not receive notice of the order until the following day. The aggregate net daily value of trades in these retirement accounts is often predictable, but Vanguard retains the right to restrict any short-term trading efforts or defer the pricing of large orders from 401(k) accounts.

Vanguard's traditional approach to protecting ongoing shareholders by restricting trades after 2:30 p.m. was probably slightly better for ongoing shareholders than the ETF shareholder protection process, even with the early-notice requirement I suggest for ETFs. Ongoing shareholders in a Vanguard index fund were more likely than ETF investors to “profit” modestly from the equivalent of a larger number of market-on-close-or-better trades by the fund manager (although the difference is probably no more than 1–2 bps a year).

In March 2004, Vanguard announced changes in its fund share trading policies. It will (1) use redemption fees more broadly than in the past, (2) permit up to four exchange transactions out of a fund each calendar year, and (3) permit all shareholders to exchange shares (between two Vanguard funds) until 4:00 p.m. (Sauter 2004).

Two questions about Vanguard's proposed changes are relevant to the policies I am suggesting:

1. Will the new approach of using redemption fees and “electronic monitoring systems . . . to track shareholder transaction activity and monitor fund cash flows” (Sauter) protect ongoing Vanguard fund shareholders from the cost of providing liquidity to entering and leaving shareholders?

Definitive evidence of how well the new Vanguard approach works for Vanguard shareholders will be publicly available only after some years of experience. Internally, however, Vanguard managers will be able to measure the effectiveness of its new approach quickly. They will be able to examine internal data for quarterly average absolute differences between actual and targeted levels of daily unequitized cash in each fund. They will also be able to measure the quarterly average absolute daily notional value of the fund portfolios' ETF share and futures positions *and* transactions. Rising values for *any* of these metrics will indicate that the forecasts of their models are not protecting ongoing shareholders from the cost of providing liquidity to late-afternoon buyers and sellers of fund shares as well as their traditional policy did. Vanguard's base-period data for these measures for 2002 and

2003 will be distorted by the presence of the large orders that were not bound by the 2:30 p.m. fund exchange cutoff before the formal policy change (Mason 2004a, 2004b), but cleaning the data should not be difficult.

The most obvious problem with Vanguard's new approach is that, *at best*, it protects only Vanguard's fund shareholders from the costs of providing liquidity to entering and leaving shareholders. Vanguard apparently believes, and I agree, that under the new policies, Vanguard will have approximately the same average competitive cost and performance advantage over most competing funds under the SEC's proposed 4:00 p.m. hard close. Vanguard will gain a marketing edge by opening up fund exchanges until 4:00 p.m., thereby publicly matching the industry standard for the first time in several years.

Vanguard's new tolerance of late-afternoon orders will almost certainly increase the cost of surveillance and the cost of providing liquidity for other funds' shareholders. Most fund companies do not claim to have sophisticated electronic monitoring and forecasting of fund shareholder transactions. If every fund company must create such a system, their fund shareholders will be paying for it. From an industrywide perspective, Vanguard's change is not helpful and it will not reduce aggregate mutual fund liquidity costs.

Ideally, the SEC should require open-end domestic equity funds to cut off orders and fund exchanges at 2:30 p.m. rather than at 4:00 p.m. On an aggregate basis, mutual fund shareholders would benefit from something like the *traditional* Vanguard process or from entry and exit exclusively through an ETF share class. The ETF and Vanguard examples suggest that an early cutoff may be a "universal solution" to fund shareholder dilution.

Where Are the Market Forces?

Market forces have not solved the free-liquidity problem for two reasons. The first is illustrated by the competition among fund advisors to make buying and, of necessity, redeeming their fund shares as convenient as possible. Vanguard's decision to accept fund exchanges until 4:00 p.m. is compelling evidence of this competitive pressure. Although there is an incentive to provide the best possible treatment to ongoing shareholders, it has been distorted by pressure to attract new shareholders. The second reason is that the regulatory framework for the purchase, sale, and evaluation of mutual fund shares is at least as great an obstacle to shareholder protection as the conflicts that fund managers face.

To understand fully why fund share trading costs are imposed on long-term shareholders and why making an effective change is difficult, one needs to examine SEC Rule 22c-1 under the Investment Company Act of 1940. This rule, which requires forward pricing of fund share purchase and sale transactions, is also the principal obstacle to implementation of an early trade cutoff. The key provision of Rule 22c-1 is in its Paragraph (a):

No registered investment company issuing any redeemable security, no person designated in such issuer's prospectus as authorized to consummate transactions in any such security, and no principal underwriter of, or dealer in, any such security shall sell, redeem, or repurchase any such security except at a price based on the current net asset value of such security which is *next computed after receipt of a tender of such security for redemption or of an order to purchase or sell such security.*¹⁷ [emphasis added]

The meaningful exceptions to Rule 22c-1(a) are limited:

1. All ETFs have exemptions from this rule to permit their shares to trade at market prices in the secondary market, but that is the extent of their exemption.
2. Some conventional funds (e.g., in the Vanguard traditional early-cutoff process) have received permission to adopt prospectus language and policies for shareholder protection that let them reject or delay pricing on some late-arriving orders.
3. The ICI obtained a no-action letter (SEC 2002b) that permits deferred pricing of share exchanges among funds in the same "family."

The SEC's published statements at the time Rule 22c-1 was implemented and subsequent statements by SEC commissioners and staff make its purpose clear: The most important aim was to reduce dilution of the holdings of ongoing shareholders when a fund sells shares to or redeems shares from entering or exiting fund shareholders.¹⁸ Prior to the implementation of Rule 22c-1, some investors were permitted to purchase shares of a fund in a rising market at a stale price that was lower than the fund's current value or than the NAV would be when next calculated. An investor might also have been able to redeem shares during a falling market at a previously set price that was higher than the fund's NAV would be when next calculated. In either case, the interests of the ongoing shareholders of the fund were being diluted by this opportunity for entering or departing shareholders to obtain better prices than they would have been entitled to if forward pricing, the principal requirement of Rule 22c-1, had been in place. Note

that until the implementation of Rule 22c-1 in 1968, backward pricing (late trading)—the most serious offense alleged in the recent Spitzer settlement—was legal.

Without question, the forward-pricing principle of Rule 22c-1 is critical to fairness and to the perception of fairness in mutual fund pricing. The fairness of forward pricing has clearly been an essential element in the increased popularity mutual funds have enjoyed since Rule 22c-1 was adopted.

The problem with Rule 22c-1 is that both conventional funds and ETFs are largely bound by the provision that they cannot sell, redeem, or repurchase their shares except at a price based on the current NAV of their shares computed after receipt of a tender of their shares for redemption or an order to purchase or sell the shares. This provision of Rule 22c-1 requires use of the *next* forward NAV computed—no matter how soon that NAV computation is made after the order comes in. This requirement for pricing immediacy is intensified by Rule 22e-2, which states that meeting the fund share sales, redemption, pricing, and timing requirements of Rule 22c-1 is the way to avoid being deemed to have suspended redemption of the fund's shares.

The pricing rules involve at least three activities that simply do not work well unless the fund's transaction requirements and liquidity demands can be anticipated and the necessary trades can be made before the NAV calculation. The three activities are

1. investing cash purchase receipts,
2. selling securities to raise cash for redemptions, and
3. unannounced changes in the composition of an ETF portfolio.

This anomalous effect of Rule 22c-1 determines the form of shareholder protection policies at certain funds. Interpretations of Rule 22c-1 by the Investment Management Division of the SEC are often designed to circumvent either the requirement that the forward price used be the next NAV posted by the fund or the requirement that orders be accepted literally until the moment of the next NAV calculation.¹⁹ Ironically, the combination of Rule 22c-1 and the even more venerable requirement that a fund accept purchase and redemption orders each day until the market close has contributed to the continuation of the very dilution of ongoing shareholders' investments that the move to forward pricing under Rule 22c-1 was designed to prevent.

Other Issues

Market structures and practices develop constituencies. Opposition to the firm 4:00 p.m. cutoff time

proposed by the SEC and others has been and will continue to be vocal. The opposition is well founded because a 4:00 p.m. cutoff by itself solves no problems. Some organizations, such as IBM Corporation (Simon 2003), have already recognized this problem and implemented 401(k) plan rules along the lines of an early-cutoff time to ameliorate the effects on ongoing shareholders of late-afternoon purchase and sale orders.

Opposition to any change to the status quo comes from many fund companies, proprietors of fund supermarkets, distributors, and transfer agents. For an illustration of the problems these entities face, note that the dominant system for assembling and forwarding fund orders is the Fund/SERV system operated by the Depository Trust & Clearing Corporation. Fund/SERV now finishes processing fund share orders in the middle of the night.²⁰ Any change in the direction of shortening the Fund/SERV processing cycle will be very costly to many of the funds that use it. These funds and their customers need to evaluate their needs for immediacy carefully.

Four key issues hinge largely on the true value to investors of rapid processing of fund share orders: the cost of the changes, how to provide liquidity, how to handle 401(k) orders, and audits.

Cost of Changes. The SEC is required by statute to estimate the costs that its regulatory proposals impose on the entities it regulates. The commission's cost estimates for its reform proposals have large gaps and feature a number of "shrugs"—acknowledging that there are *no comprehensive cost estimates*.²¹ Of course, the one-time industrywide cost of moving to my proposed firm 2:30 p.m. cutoff would run to tens of millions of dollars if the order-entry process is accelerated. If orders that do not reach the fund by 2:30 p.m. under current procedures are simply deferred until the next day, however, the added cost to the industry would be very small. Moreover, any costs would be far outweighed by the improvement in shareholders' returns.

Providing Liquidity. To the extent that a change would reduce turnover in some funds, the improvement in shareholder returns would come partly at the expense of individuals and entities that benefit from the turnover process. Some of these parties should be mollified by the proposal to accommodate any investor who wants to transact in the shares of a fund up to 4:00 p.m. on the current trading day. The investor would be able to go, directly or through a financial advisor, to a market maker unaffiliated with a fund's advisor and arrange to purchase or sell shares of the fund at a

price linked to the 4:00 p.m. NAV calculated that day. The market maker, rather than the fund's shareholders, would provide liquidity to facilitate these trades. The cost of this liquidity would be reflected in a trading spread or fee charged to the investor who requires the liquidity.

401(k) Orders. Most of the adverse comments the SEC has received on its proposed 4:00 p.m. hard close have addressed the treatment of 401(k) and similar retirement plan orders. There are ways to give retirement plan orders slightly different treatment without deferring all executions until the next trading day.

For example, regular monthly or quarterly contributions could be posted a day earlier by employers for order-entry purposes. Noncontributory 401(k) purchases could be matched against corresponding 401(k) sales. No fund flows would result on the matched trades, and only net imbalances would be deferred for a day.

An alternative, and less complicated, solution would defer pricing of all 401(k) orders until the next trading day. Anyone who accepts the premise that 401(k) money is invested long term for retirement should not object to deferred pricing. After all, long-term investors in a fund pay the greatest penalty and receive the least benefit from the free liquidity that most funds now offer. A 401(k) investor who valued immediacy could deal with the market makers who would provide same-day executions for a spread or fee. That investor would pay for the desired liquidity while other investors were protected from the cost of providing that liquidity.

Audits. If every mutual fund received all its fund share orders by 2:30 p.m. and sent a wire to the SEC by 3:00 p.m. listing purchases and sales for that day, the necessary regulatory audit would be

extraordinarily simple. Scope for the abuses cited in recent news stories would be negligible.

The execution and audit process would have to accommodate same-day exchanges from a fund in one fund family to a fund in another family at NAV if the exchange order reached both funds before 2:30 p.m. The easiest way to meet this requirement would be to value the cash purchase (for order-entry purposes) at the previous day's NAV for the fund being sold. The amount of the subsequent cash adjustment would usually be insignificant. A similar process for exchanges within a fund family would be even easier to implement.

Conclusion

The solution I recommend can be laid out in three simple parts: a normal 2:30 p.m. closing with pricing at 4:00 p.m.; only third-party trades after that time and at that day's NAV, plus or minus a liquidity/trading fee; and for funds holding non-U.S. securities, order closing at 4:00 p.m. for pricing at the NAV after a day of trading in the foreign market.

Rule 22c-1 implemented a necessary and desirable reform. Recent developments have made it increasingly clear that the rule's requirement that pricing be done almost instantaneously on a late-arriving order is not in the interest of fund shareholders. The softening of the timing feature of the rule in the ICI letter on fund exchanges (SEC 2002b) is clearly a step in the right direction, and it seems to reflect recognition at the SEC that the trading and pricing structure mandated by Rule 22c-1 is inappropriate and costly. Permitting independent market makers to accommodate investors who want to enter orders until just before 4:00 p.m. is a fairer solution. These specific investors, rather than all the fund's investors, would pay the cost of their trades.

Notes

1. Zitzewitz (2003b) estimated the dilutive effect of such trading at about \$400 million in 2001, less than 10 percent of his estimated dilution cost of market-timing trades.
2. Zitzewitz noted that Greene and Hodges (2002) "regress buy-and-hold fund returns on market performance and . . . dilution . . . and find a coefficient on dilution of 2.8" (Zitzewitz 2003a, p. 260). Zitzewitz recognized that interpreting the dilution as a cause suggests that the direct effect of dilution is less than half of the total negative effect of this trading on shareholder returns. To capture the negative effect on shareholder returns directly requires a different approach. Edelen (1999) provided that approach.
3. The no-load classification is not necessarily important. Edelen was looking at fund performance for ongoing shareholders between two points, not the return realized by a shareholder from purchase to sale.
4. The SEC is implementing requirements for quarterly reporting.
5. The incremental cost of providing liquidity may be a slightly declining percentage of total flow trading costs because higher share turnover means that purchases and sales are more likely to offset one another. The manager of a \$100 million specialty sector fund told me, however, that he came to work one morning some years ago to find that

the clients of a market timer had purchased enough shares late on the previous day to increase the size of his fund overnight by more than 50 percent. In this case, no material flow occurred on the other side of these trades; consequently, more than a third of the portfolio was in cash the morning after the timing trades came in.

6. The magnitude of the cost comes partly from the fact that this liquidity is most commonly demanded when the market is moving at the close and the movement continues into the following day. Edelen's published figures showed an abnormal negative fund return of 1.63 percent net of expenses (versus a negative return of 0.20 percent without the cost of providing liquidity). I use a net figure of 1.43 percent here. One industry executive, upon hearing the results of Edelen's analysis for the first time, observed that the performance penalty from in-and-out trading is "a lot bigger than that." Most studies of the impact of fund share trading have focused on opportunities for fund share traders to make a profit from this activity (e.g., Chalmers, Edelen, and Kadlec 2001; Greene and Hodges; Zitzewitz 2003a), and many of them focused on funds holding non-U.S. stocks (e.g., Goetzmann, Ivkovic, and Rouwenhorst 2001; Zitzewitz 2003a). Studies that tried to determine whether a fund share trader can make money ignore certain trading costs that affect ongoing shareholders more than fund share traders. Edelen's 1999 paper is the only one I have found that looks directly at the effect on ongoing investor performance.

Estimates of the average fund's expense ratio vary widely. A recent estimate by Der Hovanesian, Henry, Borrus, Dwyer, and Tergesen (2003) was 1.44 percent, conveniently close to Edelen's net liquidity cost of 1.43 percent, but I could as easily have cited expense ratios from reputable sources ranging from under 1 percent to over 2 percent. A consensus on definitions and methodology for such calculations would be useful.

7. The SEC's proposed rule on mandatory redemption fees (SEC 2004b, Note 3) cites Edelen's study, and its proposed 2 percent mandatory redemption fee is consistent with his calculation of a fund's cost of providing liquidity to entering and leaving shareholders (SEC 2004b, Notes 10 and 15).
8. Chakravarty, Panchapagesan, and Wood (2003) estimated a total institutional transaction cost reduction of 22.75 bps, or 20.5 percent of the predecimalization level of 110.5 bps. Bollen and Busse (2003) used a different methodology and found that trading costs for their fund sample increased by 137 bps following decimalization. The difference between the results appears to be largely a result of the decline in liquidity available after decimalization to large traders in common stocks. This liquidity decline is reflected more fully in the Bollen-Busse results.
9. The Edelen trading cost calculation is higher than most contemporary or more recent estimates of fund (or general institutional) trading costs precisely because it captures the effect of providing liquidity to fund share traders. The calculation does not address the costs of modifying the composition of the portfolio. Calculations of the trading costs of changing portfolio compositions use a variety of methods and may or may not include the effect of a fund's need to trade in large size. A recent SEC concept release (SEC 2004a) soliciting comments on improving disclosure of mutual fund transaction costs cited a wide range of cost estimates and estimation techniques. For example, Southall (2004) cited an estimate that a fund with 100 percent portfolio turnover would have "implicit trading costs" of 0.36 percent on top of commissions and other expenses

(Karceski, Livingston, and O'Neal 2004). Southall quoted Wayne Wagner of Plexus Group to the effect that the cost "is five to six times higher per trade than what they're saying" (p. 24). Keep in mind that these diverse estimates of fund trading costs did not specifically address the cost of providing liquidity to fund share traders.

10. These rules would apply to all conventional funds except leveraged and inverse funds that use futures contracts to implement their equity positions. Those funds would be able to use a later cutoff time. Exchange-traded funds (ETFs) should have a cutoff on in-kind creations and redemptions similar to the cutoff for conventional funds.
11. Exceptions in the SEC proposal are limited to redemptions of \$2,500 or less, financial emergencies, money market funds, ETFs, and any fund that affirmatively permits short-term trading (SEC 2004b). The SEC recognizes that enforcing the mandatory redemption fees on purchases through intermediaries would add significant complexity for many fund companies and intermediaries.
12. Zitzewitz (2003b) provided examples in which market-timing trades could be attractive to a trader even with a 2 percent fee, casting doubt on the deterrent value of redemption fees in extreme circumstances.
13. Because we considered late trades clearly illegal under SEC Rule 22c-1, we did not even ask about late trading. I expect inquiries about market timing of fund share purchases and sales today would get a more guarded response—at least temporarily.
14. The calculations behind these estimates are available in Gastineau (2004b).
15. I am using a market-on-close-or-better order as an example not because I believe every fund should or will use this type of order to achieve an appropriately invested position but because the market-on-close-or-better order is easy for most readers to understand. Also, it illustrates how a moderately skilled trader can achieve transaction cost savings relative to adjusting a portfolio on the following day.
16. Vanguard theoretically accepts wire purchase instructions until 4:00 p.m., but as the 2003 Vanguard U.S. Stock Index Funds prospectus stated, Vanguard reserves "the right to reject any purchase request that may disrupt a fund's operation or performance." Similar language discussed the policy on redemptions. The prospectus further stated, "Please call us *before* attempting to invest [redeem] a large dollar amount" (emphasis in original). Vanguard does not accept wire redemption orders.
17. Apparently, the defense in some late-trading litigation will turn on the words "next computed" and the fact that many 4:00 p.m. NAVs are not "computed" until several hours later.
18. For more details on the commission's position, see Barbash (1997), the SEC proposal of Rule 22c-1 (SEC 1968a), the SEC adoption of Rule 22c-1 (SEC 1968b, 1983), the SEC proposal to adopt an amendment to Rule 22c-1 concerning time-of-day pricing (SEC 1984), the exemption for American Express travel-related services (SEC 2000), and SEC (2002a, 2002b).
19. For example, the SEC (2002b) permits funds that receive afternoon orders to exchange shares from one fund for shares in another fund in the same family to defer pricing the exchange to the next NAV calculation plus one.
20. Fund/SERV's operations are described briefly in SEC (2003c).
21. The cost estimates for the current proposals can be found in SEC (2003b, 2003c). Most of the benefits from these proposals are only peripherally related to investment performance for fund shareholders.

References

- Barbash, Barry P. 1997. "Remembering the Past: Mutual Funds and the Lessons of the Wonder Years." Transcript of speech delivered at the 1997 Securities Law Procedures Conference sponsored by the Investment Company Institute, Washington, DC (4 December).
- Bollen, Nicholas P.B., and Jeffrey A. Busse. 2003. "Common Cents? Tick Size, Trading Costs, and Mutual Fund Performance." Working paper (May).
- Chakravarty, Sugato, Vekatesh Panchapagesan, and Robert A. Wood. 2003. "Has Decimalization Hurt Institutional Investors?" Working paper (28 May).
- Chalmers, John M.R., Roger M. Edelen, and Gregory B. Kadlec. 2001. "On the Perils of Financial Intermediaries Setting Security Prices: The Mutual Fund Wild Card Option." *Journal of Finance*, vol. 56, no. 6 (December):2209–36.
- Ciampi, Peter, and Eric Zitzewitz. 2003. "Fair Value Information Service White Papers." Financial Times Interactive Data.
- Der Hovanesian, Mara, David Henry, Amy Borrus, Paula Dwyer, and Anne Tergesen. 2003. "How to Fix the Mutual Funds Mess." *Business Week* (22 September):106–113.
- Edelen, Roger M. 1999. "Investor Flows and the Assessed Performance of Open-End Mutual Funds." *Journal of Financial Economics*, vol. 53, no. 3 (September):439–466.
- Gastineau, Gary L. 2004a. "The Benchmark Index Performance Problem." *Journal of Portfolio Management*, vol. 30, no. 2 (Winter):96–103.
- . 2004b. "Estimating the Cost to ETF Shareholders of Accepting Creation and Redemption Orders until 4:00 p.m.," Working Paper, ETF Consultants: etfconsultants.com.
- Goetzmann, William N., Zoran Ivkovic, and K. Geert Rouwenhorst. 2001. "Day Trading International Mutual Funds: Evidence and Policy Solutions." *Journal of Financial and Quantitative Analysis*, vol. 36, no. 3 (September):287–309.
- Greene, Jason T., and Charles W. Hodges. 2002. "The Dilution Impact of Daily Fund Flows on Open-End Mutual Funds." *Journal of Financial Economics*, vol. 65, no. 1 (July):131–158.
- Karceski, Jason, Miles Livingston, and Edward S. O'Neal. 2004. "Mutual Fund Brokerage Commissions." Working paper (January).
- Madhavan, Ananth. 2003. "Fair-Value-Adjusted Indexes." *Journal of Indexes* (Second Quarter):32–37.
- Mason, Todd. 2004a. "Vanguard Drops Trading Ban at Core of Scandals." *Philadelphia Inquirer* (5 March).
- . 2004b. "Later Vanguard Trading Deadline Draws Criticism." *Philadelphia Inquirer* (18 March).
- Sauter, George U. 2004. "Vanguard Moves to Strengthen, Simplify Trading Safeguards." *Institutional Investors: News*, The Vanguard Group (4 March): institutional5.vanguard.com.
- SEC. 1968a. "Investment Company Act Release No. 5413," Securities and Exchange Commission, Division of Investment Management (25 June).
- . 1968b. "Investment Company Act Release No. 5519," Securities and Exchange Commission (16 October).
- . 1983. "Investment Company Act Release No. 13183," Securities and Exchange Commission (22 April).
- . 1984. "Investment Company Act Release No. 14244," Securities and Exchange Commission (21 November).
- . 2000. "Order Exempting American Express Travel Related Services Company, Inc. from Broker Dealer Registration," File No. 4-436, Securities and Exchange Commission (24 July).
- . 2002a. "No-Action Letter under: Investment Company Act of 1940—Section 18(f), 22(d); Rule 12b-1, 22c-1: ReFlow Fund, LLC," Securities and Exchange Commission (15 July).
- . 2002b. "Letter to Investment Company Institute re: Delayed Exchange of Fund Shares: Investment Company Act of 1940—Section 11a and Rule 22c-1," Securities and Exchange Commission (13 November): www.sec.gov/divisions/investment/guidance/tyle111302.htm.
- . 2003a. "SEC Takes Steps to Address Late Trading, Market Timing and Related Abuses." Press Release 2003-168, Securities and Exchange Commission (3 December): www.sec.gov/news/press/2003-168.htm.
- . 2003b. "Proposed Rule: Disclosure Regarding Market Timing and Selective Disclosure of Portfolio Holdings." Release Nos. 33-8343, IC-26287, File No. S7-26-03, Securities and Exchange Commission (December): www.sec.gov/rules/proposed/33-8343.htm.
- . 2003c. "Proposed Rule: Amendments to Rules Governing Pricing of Mutual Fund Shares." Release No. IC-26288, File No. S7-27-03, Securities and Exchange Commission (December): www.sec.gov/rules/proposed/ic-26288.htm.
- . 2004a. "Concept Release and Request for Comments: Measures to Improve Disclosure of Mutual Fund Transaction Costs," Release Nos. 33-8349, 34-48952, IC-26313, File No. S7-29-03 (February): www.sec.gov/rules/concept/33-8349.htm.
- . 2004b. "Proposed Rule: Mandatory Redemption Fees for Redeemable Fund Securities." Release No. IC-26375A, File No. S7-11-04, Securities and Exchange Commission (February): www.sec.gov/rules/proposed/ic-26375a.htm.
- Simon, Ruth. 2003. "Fund Investors Face Early Trading Deadline." *Wall Street Journal* (17 December):D1, D3.
- Southall, Brooke. 2004. "Homing In on Fund Fees That Fly under the Radar." *Investment News* (9 February):3, 24.
- Strauss, Lawrence C. 2003. "Scandal, What Scandal?" *Barron's* (15 December):F2–F3.
- Zitzewitz, Eric. 2003a. "Who Cares about Shareholders? Arbitrage-Proofing Mutual Funds." *Journal of Law, Economics & Organization*, vol. 19 (October):245–280.
- . 2003b. "How Widespread Is Late Trading in Mutual Funds?" Stanford GSB Research Paper No. 1817 (September).
- Zweig, Jason. 2003. "The Great Fund Rip-Off." *Money* (October):51–60.