



Front-running of mutual fund fire-sales



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ABSTRACT

We show that a real-time trading strategy which front-runs the anticipated forced sales by mutual funds experiencing extreme capital outflows generates an alpha of 0.5% per month during the 1990–2010 period. The abnormal return stems from selling pressure among stocks that are below the NYSE mean size and cannot be attributed to the arrival of public information. While the largest stocks also exhibit downward price pressure, their prices revert before the front-running strategy can detect it. The duration of the anticipated selling pressure has decreased from about a month in the 1990s to about two weeks in the most recent decade. Our results suggest that publicly available information of fund flows and holdings exposes mutual funds in distress to predatory trading.

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1. Introduction

Selling pressure among the common stocks of mutual funds in distress can create a transitory price pressure, moving prices away from fundamentals (Coval and Stafford (2007)). Since fund flows are to a certain extent predictable and information on fund holdings is publicly available (albeit with a delay), there may be an incentive among sophisticated investors to exploit the expected price pressure effects by short-selling stocks, anticipating trades of mutual funds in distress. This study investigates the performance of a hypothetical trading strategy based on public information which shorts anticipated fire-sales (i.e. the anticipated forced sales by mutual funds expected to experience extreme capital outflows).

We construct our trading strategy selecting the stocks most likely to be sold by those funds that are most likely to experience severe outflows. First, we forecast fund flows using the well-documented flow-performance relationship by, among others, Ippolito (1992), Chevalier and Ellison (1997) and Sirri and Tufano (1998). Investors tend to put their money in funds with a recent successful track record and tend to pull money out of funds with a poor track record, which implies forecastability of fund flows.

Next, we use this predictability to identify the subsets of funds that are expected to experience extreme outflows or inflows. To select the stocks most likely to experience downward selling pressure, we select the stocks most widely held by funds expected to experience extreme outflows, netting out possible buying pressure from funds expected to experience extreme inflows. To make sure our strategy uses publicly available information only, we assume a two month delay between the portfolio snapshot date and the time when the holdings become available to the public. We rebalance our short portfolio of anticipated fire-sales every month, when new public information arrives.

Our results indicate that this strategy generates an alpha of 50 basis points per month during the 1990–2010 sample period, which stems from stocks that are below the NYSE mean size. The results are economically important and highly statistically significant. Generally, it is difficult to disentangle information from price pressures and hence determine the source of profitability of such a strategy. We apply an indirect approach and examine price reversals before and after the portfolio holding month. More specifically, we estimate five-factor alphas of our short portfolio around the holding month. We find strong evidence for reversals following outflow-induced price pressure and report high negative alphas before and during the holding period and high positive alphas immediately after the holding period. Furthermore, we show that the arrival of unexpected stock earnings or the realization of analysts' forecasting error cannot explain the success of the

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front-running strategy, thus ruling out alternative information-based explanations. Even though the stocks generating the success of the strategy are below the NYSE mean size, they are evenly distributed across the largest three size quintiles.¹

Our analysis of the above NYSE mean size stocks reveals that they are also subject to outflow-driven selling by mutual funds, but the price pressure among those stocks is more transitory and is harder to exploit. We report a strong selling pressure among those stocks prior to the holding period measured by a five factor alpha. However, the alpha is highly positive during the holding period which indicates that reversals among those stocks start before the trading strategy can anticipate them. There are at least two reasons why price pressure could be weaker among the largest stocks. First, institutional ownership is generally higher among larger, more liquid stocks (e.g. [Gompers and Metrick, 2001](#)). This means that for large stocks, there are more sophisticated traders and hence there is more capital available to step in when prices diverge from fundamentals. Second, information on fundamentals is easier to obtain. [Barth et al. \(2001\)](#), among others, indicate that the number of analysts covering a stock is strongly positively related to firm size, even after controlling for other stock characteristics.

In addition to the aforementioned analysis, we examine time variation in the returns of the front-running strategy and report a decreasing pattern in risk-adjusted performance, captured by a 10-year rolling five-factor alpha. The reason behind this is that the duration of the anticipated price pressures has decreased and prices already start reverting during the portfolio holding month in the second half of our sample period. Our analysis of daily returns during the holding month indicates that before 2000, the front-running strategy detects price pressures a month before they start reverting. After 2000, the duration of the identifiable price pressures has decreased to two weeks. This implies that despite the decreasing trend, the front-running strategy offers attractive returns even in more recent times and will likely remain profitable, at least in the near future.

The results in this paper provide insight into an important channel through which the situation of funds already in distress could be aggravated. Funds experiencing substantial capital outflows face an easy to implement free-riding trading strategy that could negatively affect their performance. Front-running has the potential to create negative-feedback spirals through which the distress of funds experiencing outflows could be exacerbated via the front-running trades of other investors. Furthermore, there are broad market-wide implications of front-running such as price overshooting, reduced liquidity when it is most needed, movement of prices away from fundamentals, and increased volatility (see [Brunnermeier and Pedersen, 2005](#); [De Long et al., 1990](#)).

In general, extreme fund inflows may also result in an upward price pressure enabling other market participants to front-run. However, funds with high inflows have some discretion in what to do with the inflow of money – they can scale up, initiate new positions, or retain cash for a few days/weeks until undervalued stocks are identified. In contrast, funds with high outflows can only scale down their positions, which makes the link between flows and price pressure stronger on the short side. Furthermore, funds with extreme inflows may even benefit from front-running. A front-runner who anticipates a fund's flows would go long in that fund's stocks, but the fund manager may decide not to scale up her positions and hence buy other stocks. This will benefit the fund manager who can cash the price effects associated with the front-runner's buys. In contrast, funds with extreme outflows are more likely to suffer from front-running because they can only

scale down positions in response to the outflows. This makes investigating front-running of outflow-driven sales more important as it has direct implications for funds that are already in distress.

Our paper is related to a recently developed literature on price pressure within equity markets. The common ground in this work is that it recognizes that short-term demand curves can be less than perfectly elastic due to non-informational demand shifts. For example, [Mitchell et al. \(2004\)](#) show that around mergers, uninformed shifts in demand among professional investors creates transitory price pressure. Related to mutual funds, [Ben-Rephael et al. \(2011\)](#) point to short-lived price distortions caused by aggregated daily flows to mutual funds in Israel, while [Lou \(2012\)](#) explains mutual fund persistence and stock momentum with the price pressure caused by the flow-induced trading of mutual funds. There is also evidence that firms' managers are aware of the exogenous price distortions caused by mutual fund flow trading – [Khan et al. \(2012\)](#) show that when a stock is overvalued due to high mutual fund inflows, the probability of an SEO and insider sales tends to increase.

The paper closest to ours is [Coval and Stafford \(2007\)](#). It identifies ex post the price-pressure effects caused by funds in distress and focuses on their price impact. [Coval and Stafford \(2007\)](#) further show that there is price pressure predictability among stocks with expected high outflows. We deviate from their analysis by investigating whether investors who use publicly available information only can exploit this predictability. First, since there is a delay of at most two months between the reporting date of the mutual fund holdings and the date they become available, our front-running strategy uses the same portfolio snapshots two months later than the one by [Coval and Stafford \(2007\)](#). Second, we use fund flow forecasts based on publicly available fund information prior to the construction of the short portfolio, while [Coval and Stafford \(2007\)](#) use flow forecasts based on a flow-forecasting model which uses information from their whole time period.² We contribute to the literature by showing that the negative price pressure predictability can be exploited by investors who use public information only. However, we show that this predictability cannot be exploited among the largest stocks, because their prices revert before the real-time front-running strategy can identify the price pressures. Last but not least, we show that the returns of the front-running strategies are decreasing over time but they can still be substantial.

Our paper is also related to a body of literature showing the investment benefits of institutions' portfolio disclosure. [Verbeek and Wang \(2013\)](#) investigate the performance of mutual fund copycat funds – funds that duplicate the disclosed holdings of active mutual funds, and find that such funds can generate higher returns than their target funds. [Brown and Schwartz \(2013\)](#) look at hedge funds and find no evidence that investors can benefit from disclosed hedge fund holdings, attributing the difference from the [Verbeek and Wang \(2013\)](#) study to the much more frequent portfolio rebalancing of hedge funds in comparison to mutual funds. They do, however, provide some indirect evidence that hedge funds front-run their own positions, prior to disclosure, in expectation of copy-cat investors. [Wermers et al. \(2012\)](#) show that the relative stock overweighting/underweighting in the cross-section of fund managers contains information on future returns that could be exploited. More related to our study, [Zhang \(2009\)](#) shows that some mutual fund managers can consistently identify the flow-induced sales of mutual funds in distress and benefit from providing liquidity.

¹ Note that the size distribution is highly skewed and its mean value is located in the top quintile. Thus, there are very few, but very large companies located above the mean.

² Note that the purpose of the front-running strategy of [Coval and Stafford \(2007\)](#) is to show that mutual fund flow-induced trading can establish predictability in prices, not whether this can be exploited by investors.

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