Flow induced trading by active and indexed funds: stock share return predictability in Brazil
ALINE HELENA AZEVEDO CUNHA

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Dissertação submetida para obtenção de grau de Mestre em Economia
Insper Instituto de Ensino e Pesquisa, Finanças
Orientador: Marco Antonio Cesar Bonomo

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Dissertação submetida para obtenção de grau de Mestre em Economia, Insper Instituto de Ensino e Pesquisa, Finanças

DATA DE APROVACAO: 15/01/2016

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ABSTRACT

The paper intends to analyze the impact of active and indexed funds' expected future flows in the return of the stock shares they hold. In order to do so, we built a variable that takes in account how the funds respond to new flows, regarding the transaction of shares, and the expected flow, separating funds classified as Pure Indexing, Closet Indexed and Stock Picking. The results show that the variable helps to explain shares' return especially in holding periods of four, five and six months. We also built long-short portfolios considering the output of the model and the results show that they perform better than the risk free benchmark in the most part of the period.

Key-words: price pressure, funds, flow induced trading, long-short portfolio
EXECUTIVE SUMMARY

This paper uses theories of the behavioral finance field, stating that stock share’s return do not always follow a random walk process due to the biased and, in a certain way predictable behavior of market participants.

For example, we can try to find some predictability in stock shares returns by analyzing the behavior of fund managers and investors in the equity fund’s industry. In order to do that, we need to answer some questions.

Is it possible to predict new inflows or outflows to funds by looking to its past returns? The results show that past returns help to explain future flows to funds.

Next, is it possible to predict if the fund manager will invest the cash amount of the new flow in the same shares the fund already holds? And how does a fund manager reacts to outflows? Does he sell its stock shares in a way to keep the same proportion of the portfolio? Also, can this behavior change according to the type of fund management (active or indexed management)?

Analyzing the composition and the value of the funds during the years, we can answer all these questions and create a variable that reflects the potential demand for buying or selling that share in the next periods, according to the expected behavioral of the fund managers and investors.

The last question is if that variable is relevant to predict share’s return. We then run a regression and the results show that the variable helps to predict returns especially after four, five and six months of holding.

Finally, we build zero cost portfolios that buy shares with larger expected return and sell shares with smaller expected return. The strategy’s performance is mostly positive during the years of the analysis.
SUMMARY

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1 INTRODUCTION

Several studies in the finance area concluded that some variables have predictable power over stock shares returns, especially past return. This effect is known in the literature as stock momentum. Hong and Stein (1999) described a model featuring two types of not completely rational agents interacting in the market, with slowly diffusing news leading to opportunities of arbitrage with stock price momentum. Hong, Lim and Stein (2000) tested the model and the results stated that it works especially for low coverage stocks and past losers other than large size stocks and past winners. Barberis, Shleifer and Vishny (1998) also presented a model trying to explain the stock momentum, considering how investors form expectations of future earnings, sometimes overreacting and sometimes underreacting to news.

Other empirical results show that mutual fund performance is persistent and that the smart money effect is relevant. That means that stock shares held by funds that face inflows in the current period are expected to face an increased demand in the next period. In the same way, shares held by funds that faced outflows in the current period are expected to face sales in the next one.

Putting together these two empirical facts, it is possible to imagine that a flow-induced mechanism can help to explain the return predictability of stock shares. As explained by Lou (2012), rather than suggesting a direct link between a stock’s (or fund’s) past performance and its own future performance, the flow-induced trading return mechanism maintains that the expected stock return is partially determined by the past performance of mutual funds that are holding the stock.

Bonomo, Gonzales and Ribeiro (2014) studied the impact of investment funds flows in the momentum of Brazilian shares, during the period of 2005 to 2012. With the methodology used by Lou (2012), they built a variable able to measure this impact following three steps: first, estimate how the funds distribute negative and positive flows in the share portfolio they hold; second, estimate how past return e

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1 Chevalier and Ellison (1997)
2 Other studies also tried to find an institutional explanation for momentum. Vayanos and Wooley (2013) built a model with rational investors where the fund’s flow is responsible for stock share momentum and reversal as they exhibit inertia.
past flows help to predict future flows. Lastly, build the expected flow based on past-accumulated return, and then create the variable of interest.

The purpose of this paper is to make the same analysis, but building the variable in a way to account for the difference between active and indexed funds’ response to flows. Therefore we run step one in three different samples according to a “how active” variable, suggest by Cremers and Petajisto\textsuperscript{3}. The variable is built comparing share’s participation in the fund’s portfolio with share’s participation in the index. The sample is then divided in three groups as suggested by the authors: Pure Indexing funds, with small active management, Closet Indexers funds and Stock Picking funds, with large active management.

The results show that funds classified as Pure Indexing reinvest approximately 98% of new flows in the same shares; funds classified as Closet Indexers reinvest approximately 56% of new flows in the same portfolio, while the Stock Picking funds reinvest approximately 26%.

We also run step two in the three different samples, and the results show that past benchmark-adjusted return accumulated for 6 months helps to explain future flow, and that the more indexed the fund, more its flow respond to past return.

After building the FIT variable, considering the different coefficients and responses, we run a regression to test if this variable helps to explain shares’ return in holding periods from one to six months. The results show that the variable is relevant to explain share’s return in holding periods of four, five and six months.

After that, we form monthly-rebalanced portfolios, long in shares with larger predicted return and short in the ones with smaller predicted return, considering the holding periods we found that the variable is significant. The results show that the strategy is successful in most of the periods. Considering the sample with all shares and the holding period of five months, the strategy yields an average annual return of 20%, from 2005 to 2015.

This paper proceeds as follows. In Section 2 the description of the dataset, in Section 3 the results of the analysis and in Section 4 the portfolio formation and return pattern. Finally, Section 5 concludes.

\textsuperscript{3} Cremers and Petajisto (2009)
2 DATA

The fund database was provided by Quantum and it covers funds’ NAV, return and holdings information for the period starting on January 2005 to March 2015. We selected funds classified as Ibovespa Active, IBX Active, Ibovespa Indexed and IBX Indexed.

Shares’ closing prices, number of shares outstanding, book-to-market, market value, stock liquidity and turnover were obtained from Economatica’s database for the same period and frequency.

Ibovespa and IBRX data, such as historical portfolios and returns were obtained at Bloomberg database.

During the last three years of the sample, the percentage of the stock market held by the institutional investors goes to 9%, from a 7% level in 2012 as reported by Bonomo, Gonzales and Ribeiro (2014), what indicates that the influence of funds trade in this market continues to grow. According to BM&FBovespa reports, since 2010 institutional investors is the second largest player in the Bovespa segment, just after foreign investors, representing approximately 30% of the participation in trades.

3 FUNDS CLASSIFICATION

3.1 Active Share

In order to classify the funds in the sample according with their active or indexed management, we use a measure suggested by Cremers and Petajisto (2009), the Active Share. The idea is to compare the holdings of the fund with its benchmark index. The measure is defined as:

$$Active\ Share_{i,t} = \sum_{i=j}^{N} |w_{fund,j} - w_{index,j}|$$

Where $w_{fund,j}$ and $w_{index,j}$ are the portfolio weights of the share $j$ in the fund and in the benchmark index, respectively. The sum is taken over all equity long positions. As explained by the authors, the measure is very intuitive. The larger its
value, more active is the management of the fund, as more of its positions differ from the composition of the index.

4 RESULTS

4.1 ACTIVE MANAGEMENT

Using the same criteria as Cremers and Petajisto (2009), funds with active share smaller than 20% are considered Pure Indexing funds. Closet Indexers are funds with active share between 20% and 60%. Lastly, funds with active share larger than 60% are considered Stock Picking funds.

The active share measure was calculated for which fund every month, so the same fund can have more than one classification during the years. In the sample, approximately 5% of the observations were classified as Pure Index funds, 45% as Closet Indexers and 50% had large active share and were classified was Stock Picking funds.

Almost half of the sample carries the same classification through the years. Only one fund remained as Pure Indexing, 19 as Closet Indexers and 220 funds were classified as Stock Picking in the entire period of the analysis. Approximately 35% of the sample varies between Closet Indexers and Stock Picking, and 12% of the sample varies among the three types of active management.

4.2 TRADE AS FLOWS’ RESPONSE

Following Bonomo, Gonzales and Ribeiro (2014) and Coval and Stafford (2007), the flow of fund $i$ during period $t$ is calculated as per below:

$$Flow_{i,t} = \frac{NAV_{i,t} - NVA_{i,t-1}(1 + RET_{i,t})}{NVA_{i,t-1}}$$

Where $NAV_{i,t}$ and $RET_{i,t}$ are, respectively, the fund’s net asset value and return in period $t$. It is considered that flows occur at the end of the month and all dividends are reinvested in the same fund.

\[4\text{ Approximately 2% varies between Pure Indexing and Closet Indexers}\]
In order to analyze how funds respond to flows, we estimate the following panel regression:

\[
\ln\left(\text{trade}_{i,j,t} + 1\right) = \beta_0 + \beta_1 \ln(1 + \text{Flow}_{i,t}) + \beta_2 X + \beta_3 \ln(1 + \text{Flow}_{i,t})X + \varepsilon_{i,j,t}
\]

where,

\[X' = (\text{own}_{i,j,t-1}, \text{liq}_{j,t-1}, \text{own}_{i,t-1}, \text{liq}_{i,t-1})\]

And, \(\text{trade}_{i,j,t}\) is the percentage trade of share \(j\), held by fund \(i\) on month \(t\); \(\text{Flow}_{i,t}\) is the flow variable calculated as per above. In order to control for participation and other size-related constrain, we include \(\text{own}_{i,j,t-1} = \text{shares}_{j,i,t-1}/\text{out}_{j,t-1}\), which is the fraction of share \(j\) owned by fund \(i\) compared with the outstanding amount of that share on the previous month. We also include \(\text{liq}_{j,t-1}\) which is the market liquidity of share \(j\) on month \(t-1\), to account for marginal liquidity cost. Lastly, to measure the degree of partial scaling at the portfolio level, we include \(\text{own}_{i,t-1}\) and \(\text{liq}_{i,t-1}\) which are, respectively, the weighted average of the participation and the liquidity measure, using the participation of the shares in the fund’s portfolio as weights.

The independent variables should capture the component of trade induced by flow, and the residual term captures the information-driven component. We conducted a fixed effects panel, as the flows might be correlated with the fund’s reputation that changes little with time. We also adjusted the error term by heteroscedasticity and autocorrelation clustered by fund, as they might vary between the groups.

For the sample of Pure Indexing funds, the results are shown in Table 1 below. Table 2 shows the results for the Closet Indexers funds, and Table 3 for the Stock Picking funds.

**Table 1 - Response of trade with Pure Indexing fund’s flow**

This table reports the results of the regression on the dependent variable \(\ln(\text{trade}_{i,j,t} + 1)\), which is the percentage change of share in stock \(j\) held by fund \(i\) from month \(t-1\) to \(t\). \(\text{own}_{i,j,t-1}\) is the quantity of stock \(j\) shares held by fund \(i\) compared with the amount outstanding at the time \(t-1\). \(\text{liq}_{j,i,t-1}\) is the market liquidity of stock \(j\) in month \(t-1\). \(\text{own}_{i,t-1}\) and \(\text{liq}_{i,t-1}\) are, respectively, the average of \(\text{own}_{i,j,t-1}\) and \(\text{liq}_{j,i,t-1}\) weighted by the share’s participation in the fund. T-statistics, shown in parentheses below the
Coefficient estimates, are computed based on standard errors clustered at the fund level. **Significant at the 1% level; *Significant at the 5% level.

<table>
<thead>
<tr>
<th></th>
<th>[1]</th>
<th>[2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \ln(1 + Flow_{i,t}) )</td>
<td>0.606*</td>
<td>0.986**</td>
</tr>
<tr>
<td>( own_{i,t-1} )</td>
<td>-0.006</td>
<td>(1.05)</td>
</tr>
<tr>
<td>( liq_{j,t-1} )</td>
<td>-0.012</td>
<td>(0.88)</td>
</tr>
<tr>
<td>( own_{i,t-1} )</td>
<td>-0.014</td>
<td>(0.86)</td>
</tr>
<tr>
<td>( liq_{i,t-1} )</td>
<td>0.049</td>
<td>(0.87)</td>
</tr>
<tr>
<td>( \ln(1 + Flow_{i,t}) ) * ( own_{i,t-1} )</td>
<td>-0.003</td>
<td>(0.11)</td>
</tr>
<tr>
<td>( \ln(1 + Flow_{i,t}) ) * ( liq_{j,t-1} )</td>
<td>0.002</td>
<td>(0.22)</td>
</tr>
<tr>
<td>( \ln(1 + Flow_{i,t}) ) * ( own_{i,t-1} )</td>
<td>1.233**</td>
<td>(4.99)</td>
</tr>
<tr>
<td>( \ln(1 + Flow_{i,t}) ) * ( liq_{i,t-1} )</td>
<td>-0.343**</td>
<td>(4.14)</td>
</tr>
<tr>
<td>( Const )</td>
<td>0.246**</td>
<td>0.195**</td>
</tr>
<tr>
<td>( N )</td>
<td>26,288</td>
<td>25,298</td>
</tr>
</tbody>
</table>

**Table 2 - Response of trade with Closet Indexers fund’s flow**

This table reports the results of the regression on the dependent variable \( \ln(trade_{i,t} + 1) \), which is the percentage change of share in stock \( j \) held by fund \( i \) from month \( t-1 \) to \( t \). \( own_{i,t-1} \) is the quantity of stock \( j \) shares held by fund \( i \) compared with the amount outstanding at the time \( t-1 \). \( liq_{j,t-1} \) is the market liquidity of stock \( j \) in month \( t-1 \). \( own_{i,t-1} \) and \( liq_{i,t-1} \) are, respectively, the average of \( own_{i,t-1} \) and \( liq_{i,t-1} \) weighted by the share’s participation in the fund. T-statistics, shown in parentheses below the coefficient estimates, are computed based on standard errors clustered at the fund level. **Significant at the 1% level. *Significant at 5% level.
Table 3 - Response of trade with Stock Picking fund’s flow

This table reports the results of the regression on the dependent variable $ln(trade_{i,j,t} + 1)$, which is the percentage change of share in stock $j$ held by fund $i$ from month $t-1$ to $t$. $own_{i,j,t-1}$ is the quantity of stock $j$ shares held by fund $i$ compared with the amount outstanding at the time $t-1$. $liq_{j,t-1}$ is the market liquidity of stock $j$ in month $t-1$. $own_{i,t-1}$ and $liq_{i,t-1}$ are, respectively, the average of $own_{i,j,t-1}$ and $liq_{j,t-1}$ weighted by the share’s participation in the fund. T-statistics, shown in parentheses below the coefficient estimates, are computed based on standard errors clustered at the fund level. **Significant at the 1% level. *Significant at 5% level.

<table>
<thead>
<tr>
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<th>[1]</th>
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</tr>
</thead>
<tbody>
<tr>
<td>$\ln(1 + Flow_{i,t})$</td>
<td>0.182**</td>
<td>0.2641*</td>
</tr>
<tr>
<td></td>
<td>(3.32)</td>
<td>(2.32)</td>
</tr>
<tr>
<td>$own_{i,j,t-1}$</td>
<td>-0.0054</td>
<td>-0.0054</td>
</tr>
<tr>
<td></td>
<td>(0.56)</td>
<td>(0.97)</td>
</tr>
<tr>
<td>$liq_{j,t-1}$</td>
<td>-0.005</td>
<td>-0.004*</td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(1.99)</td>
</tr>
<tr>
<td>$\ln(1 + Flow_{i,t}) * own_{i,j,t-1}$</td>
<td>-0.011</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(0.34)</td>
<td>(0.34)</td>
</tr>
<tr>
<td>$\ln(1 + Flow_{i,t}) * liq_{j,t-1}$</td>
<td>0.014**</td>
<td>0.014**</td>
</tr>
<tr>
<td></td>
<td>(2.73)</td>
<td>(2.73)</td>
</tr>
<tr>
<td>$\ln(1 + Flow_{i,t}) * own_{i,t-1}$</td>
<td>0.678</td>
<td>0.678</td>
</tr>
<tr>
<td></td>
<td>(1.81)</td>
<td>(1.81)</td>
</tr>
<tr>
<td>$\ln(1 + Flow_{i,t}) * liq_{i,t-1}$</td>
<td>-0.064</td>
<td>-0.064</td>
</tr>
<tr>
<td></td>
<td>(1.53)</td>
<td>(1.53)</td>
</tr>
<tr>
<td>$\ln(1 + Flow_{i,t}) + Const$</td>
<td>0.685**</td>
<td>0.691**</td>
</tr>
<tr>
<td></td>
<td>(1511)</td>
<td>(183.20)</td>
</tr>
<tr>
<td>$N$</td>
<td>237,245</td>
<td>231,066</td>
</tr>
</tbody>
</table>

As expected, the coefficient of flow decreases as the fund becomes more active in management.

Regressing the trade percentage only with the flow variable, the rise of 1% in the flow raises the transaction of that share in approximately 60%\(^5\) for a Pure Indexing fund. When we include the control variables and the interactions with the variable of interest in the regression, the coefficient increases to 98%, which can be consider a benchmark case, where all new flows are reinvested in the same portfolio.

\(^5\) In line with Bonomo, Gonzales and Ribeiro (2014), we are also considering that $r = ln(1+r)$
as explained by Lou (2012). The interaction of flow and own_{i,j,t-1} is also significant, which means that the omission of this variable underestimates the magnitude of the flow coefficient.

For the Closet Indexers and Stock Picking funds, regressing only the flow variable also underestimate the coefficient, as some control variables are shown to be significant.

Looking at the Closet Indexed funds, the rise of 1% in the flow raises the transaction of the shares in approximately 56%, considering the regression with all variables and its interactions. Finally, for the Stock Picking funds, the coefficient falls to 26%.

### 4.3 Expected Fund Flows

As Bonomo, Gonzales and Ribeiro (2014) and Lou (2012), we expect future flows to be explained by past flows and past returns of the funds, but also past returns of its benchmarks. To capture the magnitude of this influence, we conducted the following Fama-Macbeth (1973) regression:

\[
Flow_{i,t} = \alpha_1 + \alpha_2 \sum_{t}^{12} Flow_{i,t-w} + \alpha_3 Adjret_{i,t-1:t-6} + Bmret_{t-1:t-6} \epsilon_{i,t}
\]

Where the dependent variable is fund \( i \) flow in month \( t \), \( Flow_{i,t-w} \) is the fund \( i \) flows in the past 12 months, \( Adjret_{i,t-1:t-6} \) is the fund 6 months accumulated return adjusted by the benchmark, and \( Bmret_{t-1:t-6} \) is the benchmark six months accumulated return. The regressions are conducted separating the sample in the three groups of funds, according with their active management. The results are shown in Table 4 below.

### Table 4 - Expected Fund Flow

This table reports the results of the regression in the dependent variable \( Flow_{i,t} \) for Pure Indexing, Closet Indexers and Stock Picking funds. \( Adjret_{i,t-1:t-6} \) is the fund return adjusted by the benchmark accumulated for the past six months. \( Flow_{i,t-w} \) is the flow to fund \( i \) in the past \( w \) month. T-statistics, shown in parentheses below the coefficient estimates, are computed based on Fama Macbeth standard errors. ***Significant at 1%; **Significant at 5%; * Significant at 10%.
As expected, past return is important to predict future flow (smart money effect). The response in flow of the adjusted return varies little between Closet Indexers and Stock Picking funds, but the Pure Indexing are more sensible to past returns than the more active funds. Past flows were not significant in any of the regressions.

### 4.4 Flow Induced Trading

Using the separate sample results above, we calculated the fitted values of expected fund flow as per below:

\[
E^{pi}_{t}[Flow_{i,t+1}] = \hat{\alpha}_1 + \hat{\alpha}_2 Flow_{i,t-6} + \hat{\alpha}_3 Adjret_{i,t-1:t-6} \\
E^{ci}_{t}[Flow_{i,t+1}] = \hat{\alpha}_1 + \hat{\alpha}_2 Flow_{i,t-6} + \hat{\alpha}_3 Adjret_{i,t-1:t-6} + \hat{\alpha}_4 Bmret_{t-1:t-6} \\
E^{sp}_{t}[Flow_{i,t+1}] = \hat{\alpha}_1 + \hat{\alpha}_2 Flow_{i,t-1} + \hat{\alpha}_3 Flow_{i,t-6} + \hat{\alpha}_4 Adjret_{i,t-1:t-6} + \hat{\alpha}_5 Bmret_{t-1:t-6}
\]

Using these predicted values, we now build the following variable in order to measure how the trade of the shares is induced by expected fund flow:

\[
E_t[FIT_j] = \frac{\sum_i shares_{i,j,t} \left[1 + E_t^{[type]}[Flow_{i,t+1}]^{TF} - 1\right]}{\sum_i shares_{i,j,t}}
\]

Where \(shares_{i,j,t}\) is the amount of stock share \(j\) held by fund \(i\) on time \(t\). TF is the sensibility of trade estimated in section 2 above: 0.98 for pure indexing funds, 0.56 for closet indexers and 0.26 for stock picking funds.
As explained by Lou (2012), the denominator should capture the liquidity provision in the market, so that the ratio reflects the resulting short-term price impact. The choice of total shares held by mutual funds is motivated by the empirical observations that mutual fund managers have a strong preference for liquid stocks (e.g., Gompers and Metrick (2001)) and that they end up acting as active liquidity providers for their own market (e.g., Da, Gao, and Jagannathan (2007)).

4.5 Share Return in Response of FIT

We now conduct a Fama Macbeth (1973) and Pooled MQO regression to verify if the Flow Induced Trade helps to explain return of the shares that at some point were held by the funds in the sample. For 258 different shares, holding periods from one to six months, we conducted the below regression where we include the FIT variable and control variables that the literature believes help to explain share’s returns.

\[ R_{jt+h:t} = \gamma_0 + \gamma_1E_t[FIT_j] + \gamma_2\ln\text{Marketcap}_{jt} + \gamma_4BM_{jt} + \gamma_5\text{meanturnover}_{jt,t} + \epsilon_{jt+h:t} \]

Where the dependent variable is the cumulative stock return on the following \( h \) months. In the right hand side, \( FIT_j \) is the flow induced trading calculated as section 3.3. above; \( \ln\text{Marketcap}_{jt} \) and \( BM_{jt} \) are, respectively, the market capitalization and the book-to-market ratio at the end of month \( t \), and \( \text{meanturnover}_{jt,t} \) is the average monthly share turnover in the previous year.

Running the Fama Macbeth (1973) regression, considering all shares, the results show that the FIT variable helps to explain the return for the 2 and 3 months holding periods with 5% significant level, and of 1, 4, 5 and 6 months with 1% significant level. In the pooled OLS regression, the results show the significance of the FIT variable for all periods, but with a magnitude close to zero.

Table 5 - Stock Shares Momentum with all shares (Fama Macbeth)

This table reports the results of the regression in the dependent variable \( R_{jt+h:t} \) which is the cumulative stock return from month \( t \) to \( t+h \). \( E_t[FIT_j] \) is the expected flow-induced trading of stock share \( j \) on month \( t \), calculated as per above. \( \ln\text{Marketcap}_{jt} \) is the log of the market capitalization of
stock share $j$ on month $t$. $BM_{jt}$ is the book-to-market ratio of stock share $j$ on month $t$. $\text{meanturnover}_{jt}$ is the monthly average turnover of stock share $j$. T-statistics, shown in parentheses below the coefficient estimates, are computed based on Fama Macbeth standard errors. **Significant at 1%; *Significant at 5%.

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<th>h=2</th>
<th>h=3</th>
<th>h=4</th>
<th>h=5</th>
<th>h=6</th>
</tr>
</thead>
<tbody>
<tr>
<td>$E_t[FIT_j]$</td>
<td>0.102**</td>
<td>0.063*</td>
<td>0.094*</td>
<td>0.137**</td>
<td>0.141**</td>
<td>0.157**</td>
</tr>
<tr>
<td></td>
<td>(3.59)</td>
<td>(2.22)</td>
<td>(2.31)</td>
<td>(2.80)</td>
<td>(2.93)</td>
<td>(2.76)</td>
</tr>
<tr>
<td>$\ln\text{Marketcap}_{jt}$</td>
<td>0.000</td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.001</td>
<td>-0.003</td>
<td>-0.004</td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(0.10)</td>
<td>(0.34)</td>
<td>(0.89)</td>
<td>(1.35)</td>
<td>(1.70)</td>
</tr>
<tr>
<td>$BM_{jt}$</td>
<td>0.001</td>
<td>-0.000</td>
<td>-0.000</td>
<td>0.000</td>
<td>-0.000</td>
<td>-0.000</td>
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<tr>
<td></td>
<td>(0.87)</td>
<td>(0.34)</td>
<td>(0.05)</td>
<td>(0.07)</td>
<td>(0.14)</td>
<td>(0.19)</td>
</tr>
<tr>
<td>$\text{meanturnover}_{jt}$</td>
<td>-0.033</td>
<td>-0.055</td>
<td>-0.003*</td>
<td>-0.135*</td>
<td>-0.167*</td>
<td>-0.182*</td>
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<tr>
<td></td>
<td>(1.01)</td>
<td>(1.78)</td>
<td>(2.14)</td>
<td>(2.45)</td>
<td>(2.53)</td>
<td>(2.36)</td>
</tr>
<tr>
<td>Const</td>
<td>-0.001</td>
<td>0.013</td>
<td>0.029</td>
<td>0.059</td>
<td>0.094*</td>
<td>0.135*</td>
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<tr>
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<td>(0.08)</td>
<td>(0.89)</td>
<td>(1.26)</td>
<td>(1.83)</td>
<td>(2.24)</td>
<td>(2.54)</td>
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<tr>
<td>$N$</td>
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<td>21,004</td>
<td>20,735</td>
<td>20,468</td>
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We run the same analysis but now considering only the most liquid shares: shares with the mean turnover from the last year larger than the mean turnover of all shares in the last year. Approximately one third of the shares where included in the sample using this methodology. The results are shown in Table 6 below.

**Table 6 - Stock Shares Momentum with liquid shares (Fama Macbeth)**

This table reports the results of the regression in the dependent variable $R_{j,t+h}$, which is the cumulative stock return from month $t$ to $t+h$. $E_t[FIT_j]$ is the expected flow-induced trading of stock share $j$ on month $t$, calculated as per above. $\ln\text{Marketcap}_{jt}$ is the log of the market capitalization of stock share $j$ on month $t$. $BM_{jt}$ is the book-to-market ratio of stock share $j$ on month $t$. $\text{meanturnover}_{jt}$ is the monthly average turnover of stock share $j$. T-statistics, shown in parentheses below the coefficient estimates, are computed based on Fama Macbeth standard errors. **Significant at 1%; *Significant at 5%.

<table>
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<td>$E_t[FIT_j]$</td>
<td>0.020</td>
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<td>0.031</td>
<td>0.035</td>
<td>0.032</td>
<td>-0.060</td>
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<tr>
<td></td>
<td>(0.36)</td>
<td>(0.70)</td>
<td>(0.42)</td>
<td>(0.24)</td>
<td>(0.18)</td>
<td>(0.39)</td>
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<tr>
<td>$\ln\text{Marketcap}_{jt}$</td>
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<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.001</td>
<td>-0.004</td>
</tr>
<tr>
<td></td>
<td>(0.85)</td>
<td>(0.04)</td>
<td>(0.07)</td>
<td>(0.38)</td>
<td>(0.66)</td>
<td>(1.35)</td>
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<tr>
<td>$BM_{jt}$</td>
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<td>0.004</td>
<td>0.010</td>
<td>0.009</td>
<td>0.014*</td>
<td>0.154*</td>
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<tr>
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<td>(0.99)</td>
<td>(1.27)</td>
<td>(1.76)</td>
<td>(1.55)</td>
<td>(2.02)</td>
<td>(2.00)</td>
</tr>
<tr>
<td>$\text{meanturnover}_{jt}$</td>
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<td>-0.077</td>
<td>-0.154*</td>
<td>-0.214**</td>
<td>-0.284**</td>
<td>-0.351**</td>
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<td>(1.05)</td>
<td>(1.79)</td>
<td>(2.32)</td>
<td>(2.75)</td>
<td>(3.21)</td>
<td>(3.78)</td>
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<td>0.036</td>
<td>0.057</td>
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<td>(0.32)</td>
<td>(0.42)</td>
<td>(1.01)</td>
<td>(1.38)</td>
<td>(2.05)</td>
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<tr>
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<td>6,011</td>
<td>5,929</td>
<td>5,859</td>
<td>5,791</td>
<td>5,719</td>
</tr>
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</table>

Considering only the most liquid shares, the results show that our variable is not significant to explain stock share return in all holding periods.
5 PORTFOLIO LONG-SHORT

5.1 PORTFOLIO FORMATION

To investigate the effectiveness of the measure, we put together portfolios using a long short strategy, rebalanced every month according with the predicted return derived from the Fama Macbeth (1973) regression, for holding periods from four to six months. The portfolios are long the first 10 shares with larger predicted return, and short the last 10 shares with the smallest predicted return. The period goes from December 2005 to March 2015. The portfolio return is compared with the the risk free rate in Brazil, the CDI. The accumulated and average returns of the portfolios are shown in the next section.

5.2 PORTFOLIO RETURN

Graph 1 shows the result of the portfolio considering all shares for the four months holding period. The lighter line shows the accumulated return of an investment indexed to the CDI rate only⁶. The long-short strategy remains mostly positive, but it reaches continuous large positive by the end of 2012. Considering the entire period the average annual return is 16.65%, the standard deviation is 35% per year, the worst monthly return was -11.99% and the Sharpe Ratio for the period is 30.94%.

Chart 1 - 4 Months Holding Period – All Shares

The chart shows the accumulated return of the CDI and the Long-Short portfolio considering the 4 months holding period output, from January 2006 until March 2015.

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⁶ The CDI return is always positive and reaches 2,49 reais at the end of March 2015.
Chart 2 shows the result for the five months holding period. Considering the entire period, the average annual return is 20.92%, the standard deviation is 34.58% per year, the worst monthly return was -10.19% and the Sharpe Ratio for the period is 40.06%.

**Chart 2 - 5 Months Holding Period – All Shares**

The chart shows the accumulated return of the CDI and the Long-Short portfolio considering the 5 months holding period output, from May 2006 until December 2013.

Chart 3 shows the result for the six months holding period. Considering the entire period, the average annual return is 17.51%, the standard deviation is 32.66%
per year, the worst monthly return was -7.01% and the Sharpe Ratio for the period is 39.41%.

**Chart 3.1 - 6 Months Holding Period – All Shares**

The chart shows the accumulated return of the CDI and the Long-Short portfolio considering the 6 months holding period output, from June 2006 until March 2015.

6 CONCLUSION

The paper analyzed the impact of funds’ expected future flow on the return of shares they hold. The first step was to understand how the different types of fund respond to new flows, regarding the transaction of shares. The second step was to calculate how past flows and returns help to explain future flows. Finally, we built a variable for which type of fund that accounts for these features and run a regression to understand if it can help to explain stock share returns for holding periods from one to six months.

For the holding periods of four, five and six month we build long-short portfolios using the outputs of the model, long the shares with larger expected return, and short shares with smallest expected return. The portfolios performed better than the risk-free interest rate considering the average return during the years of the analysis.

These findings have implications for the classical finance and asset pricing theories and contribute to behavioral finance researches as another empirical
evidence of predicted returns. However, the applicability of the model in the real market might not be possible, once the funds can wait 90 days before disclosing their portfolios.

Future researchers may replicate the same analysis considering other variations in the sample, for example, separating shares according with their participation in the funds.

7 BIBLIOGRAPHY


