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CHASING STOCK MARKET RETURNS

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Chasing Stock Market Returns *

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Abstract

The standard disclaimer in the prospectus of any mutual fund reminds investors that "past performance is not necessarily indicative of future results." Despite the disclaimer, arguably a large fraction of investors looks at recent past performance to form expectations about future returns and "times the market" balancing portfolios on the basis of these expectations. We compare return-chasing and buy-and-hold investment strategies. Return-chasing is a strategy that times investments according to past stock returns. We use quarterly net flows into equity mutual funds available to Italian investors to define the exact timing of return-chasing. The historical correlation between net flows and past stock returns is positive, so that investors invest more (less) in the stock market after high (low) past stock returns. We show that return-chasing is costly for investors: over the period 1999:Q4-2014-Q4 return-chasing, on average, under-performed a simple buy-and-hold strategy on the FTSE-MIB, the S&P 500 and the DAX 30 by as much as 5% per year. The existence of transaction costs and mutual funds' entry and exit fees imply that the effective return difference between the two strategies is even larger.

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The standard disclaimer in the prospectus of any mutual fund reminds investors that "past performance is not necessarily indicative of future results." Despite the disclaimer, arguably a large fraction of investors looks just at recent past performance to form their expectations about future returns, and then balance their portfolios based on these expectations. For example, [Greenwood and Shleifer \(2014\)](#) argue that investors' expectations of future stock market returns in the period 1963-2011 are correlated with past stock returns and with the level of the stock market and not with model-implied expectations. [Chien \(2014\)](#) looks at the correlation of net current flows into US equity mutual funds with past stock market performance and finds that they are all positive and approaching 0.4 with respect to returns in the previous quarter. [Remolona et al. \(1997\)](#) investigate the possible causation link that goes from unexpected (rather than realized) recent past stock returns to mutual fund flows but did not find a strong relationship. Interestingly, [Chien \(2014\)](#) also finds that correlation of current net flows with respect to *future* equity returns are negative, even though small in magnitude: on the basis of this evidence he argues that a return-chasing investment strategy that goes long (short) equity following good (poor) realized past stock returns might be costly for the investor. For example, [Chien \(2014\)](#) shows that return-chasing under-performs a simple buy-and-hold strategy in most quarters over the period 1984:Q1-2012:Q4. Recent developments in empirical finance show that excess returns are somewhat predictable, at least in the medium to long-run (see for example [Cochrane \(2011\)](#) and the references therein) and that momentum strategies that invest in recent past winners outperform the aggregate return on the market (see for example [Jegadeesh and Titman \(1993\)](#)). Are investors exploiting the predictability in financial markets in choosing their net flows into equity mutual funds? Or, rather, are there enough investors that are not fully rational, and consistently build their portfolios using flawed expectations about future results? In order to look into these questions, we replicate [Chien \(2014\)](#)'s analysis with data on net flows to equity mutual funds available to Italian investors over the period 1999:Q4-2014:Q4 (quarterly frequency) and 1988-2014 (annual frequency). We confirm the empirical evidence that current flows are positively correlated with past stock returns in three different stock markets (i.e., Italy, the US and Germany), even though the correlations are weaker than in those found for the US. In addition, data on net flows in our sample of equity mutual funds confirm the evidence that return-chasing under-performs a simple buy-and-hold strategy in most quarters. The existence of short-sale constraints influences the difference in returns between the two strategies. In fact, in our sample return-chasing on the FTSE-MIB outperforms buy-and-hold when short-sales are not allowed. On the contrary, for investments on the S&P 500 and the DAX 30 return-chasing continues to under-perform buy-and-hold. The remainder of the paper is organized as follows: in section 1 we describe the data; in section

2 we describe the empirical results; and in section 3 we conclude.

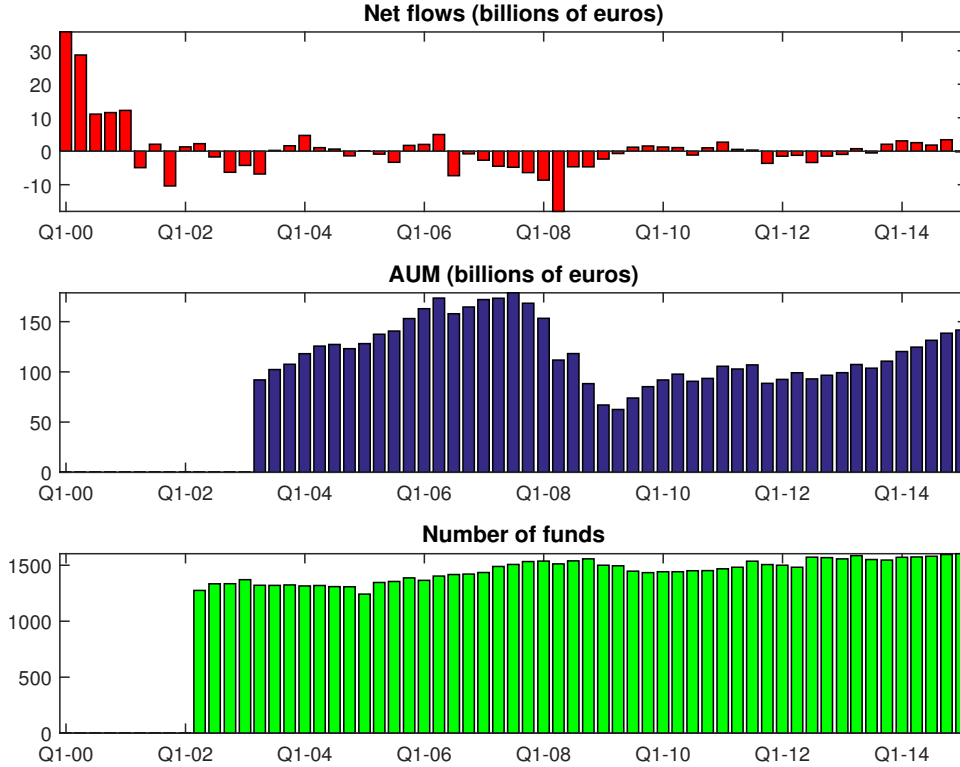
1 Data

First we collect data on net flows into equity mutual funds available to Italian investors from the publicly available [Assogestioni Cubo Database](#). We consider equity mutual funds both under the Italian and foreign law in order to include the large majority of all equity funds available to Italian investors¹. The data from Assogestioni is at annual frequency for the period 12/31/1984 - 12/31/1998 and at quarterly frequency for the period 1999:Q4-2014:Q4. The database also contains information on the total stock of assets under management and number of funds, but only starting from 2003:Q1. In the top panel of figure 1 we report the net flows into equity mutual funds; in the middle panel the stock of assets under management; and in the third panel the total number of funds in the sample. The average quarterly net flow is approximately 0.4 billions of euros and the standard deviation is 7.6 billions of euros. The largest net inflow occurs in 1999:Q4 when mutual funds received approximately 35 billions of euros, while the largest net outflow occurs at the onset of the US subprime crisis, and exactly in 2008:Q1, when investors pulled out approximately 17 billions of euros from equity mutual funds. The stock of assets under management was approximately equal to 90 billions of euros at the beginning of the sample; it reached a peak of about 180 billions of euros in 2007:Q2 and then declined to approximately 60 billions of euros in 2009:Q1 as a result of the large outflows and decline in stock prices; since then the stock of asset under management has been increasing reaching about 140 billions of euros in 2014:Q4. The total number of funds increased over the sample from 1275 to 1603.

Equity mutual funds can invest in Italian stocks, as in foreign stocks, and can follow passive or active strategies and specialize in specific industries or invest on the entire stock-market. The data on net flows represent the aggregate of all funds and we do not know which fund investors are putting money in or taking money out. We report additional information about the characteristics of the equity mutual funds in our sample as of December 2014 in table 1. The table shows that approximately 30% of the funds' asset under management are invested in Italy and Europe; 18% in the United States and 18% in emerging markets. A large fraction of approximately 34% belongs to the "other" category that groups funds investing in specific industries (e.g., energy, commodities, finance, healthcare) to which we could not assign any geographical area of investment. These shares have been very stable since 2008, which is the first year for which we have data on the area of investment.

¹In Italy, the gross stock of assets under management (AUM), including all mutual funds, is approximately 1000 billions of Euros and the number of investors is approximately 8 millions.

Figure 1: Mutual funds net flows



The top panel of this figure plots the net flows into equity mutual funds available to Italian investors (in billions of Euros). The middle panel plots the aggregate stock of assets under management (in billions of Euros) of the equity mutual funds in the sample. The bottom panel plots the total number of funds. Data are quarterly from [Assogestioni Cubo Database](#) and include all the equity funds available to Italian investors. The sample is 1999:Q4-2014:Q4 for the net flows, and 2003:Q1-2014:Q4 for asset under management and number of funds.

Since we do not have information, at the fund level, about their investment markets, we take as proxy the benchmark Italian, US and German stock market indices². For the Italian market, we collect data on the FTSE-MIB total return index (the S&P MIB prior to June 2009); for the US data on the S&P 500 total return index; and for Germany data on the DAX30. Data are at quarterly frequency for the period 1999:Q4-2014:Q4. Since data on net flows are available starting at the end of 1984 at annual frequency, we also collect data on the same indices at annual frequency for the period 12/31/1984-12/31/2014 as robustness check. Note that the FTSE-MIB and DAX30 are denominated in Euros, while the S&P 500 in US dollars. Table 2 reports summary statistics on the quarterly total returns. The mean quarterly return on the Italian equity index is equal to 0.67%, and it is less than half of the mean return on the S&P 500 (1.63%) and the DAX30 (1.94%). Returns on the DAX30

²We assume that the benchmark German stock index is a proxy for European equity. For additional information regarding Italian mutual funds refer to [Borri and Russo \(2011\)](#)

Table 1: Funds' investment market as of December 2014

Market	N. funds	%	AUM	%
Italy	42	2.62	6078.50	4.41
Europe	312	19.46	34413.80	24.98
United States	160	9.98	24718.60	17.94
Emerging markets	340	21.21	25400.50	18.44
Other	749	46.72	47156.20	34.23
Total	1603	100.00	137767.60	100.00

This table reports, for all the mutual funds in the sample, a break-down with respect to the main geographical area of investment as of December 2014. The main areas of investment are: Italy, Europe, the United States and emerging markets. The "other" category groups funds which we could not explicitly assign any of the main areas of investment. For each category, we report the number of funds and the asset under management (AUM).

tend to be more volatile (13.09%) with respect to the FTSE MIB (10.74%) and the S&P 500 (8.62%). Investing in equity markets is risky: the minimum quarterly returns are smaller than -20% in all three markets, but also the maximum quarterly returns are large and range from approximately 16% for the S&P 500 to 35% for the DAX 30. There is some short-run predictability in the quarterly returns of the Italian and US stock indices, with first order auto-correlation coefficients respectively equal to 0.18 and 0.13. Returns on all three indices exhibit negative skewness and kurtosis in line with normal returns, with the exception of the DAX30 with kurtosis of 4.13. Correlation coefficients with respect to the S&P 500 are large and equal to 0.84 for the FTSE MIB and 0.88 for the DAX30. Figure 2 plots the time-series of the quarterly returns and visually confirms the high level of co-movements of the three series and the higher volatilities of the German and Italian stock returns.

2 Results

If investors based their portfolio decisions on recent past stock returns, we should observe a positive correlation between past performance and mutual fund net flows. Following Chien (2014), we first compute simple correlation coefficients between stock returns, with different leads and lags, and current net flows into equity mutual funds available to Italian investors. For net flows we consider a beginning of period convention and assume that they occur at the beginning of the quarter. We date returns depending on when they are realized. For example, at the beginning of quarter t investors buy F_t units of the market index, and their return in quarter t is $F_t \times R_{t,1}$, where $R_{t,1}$ is the quarterly return for an investor that buys the index

Table 2: Returns: Summary Statistics

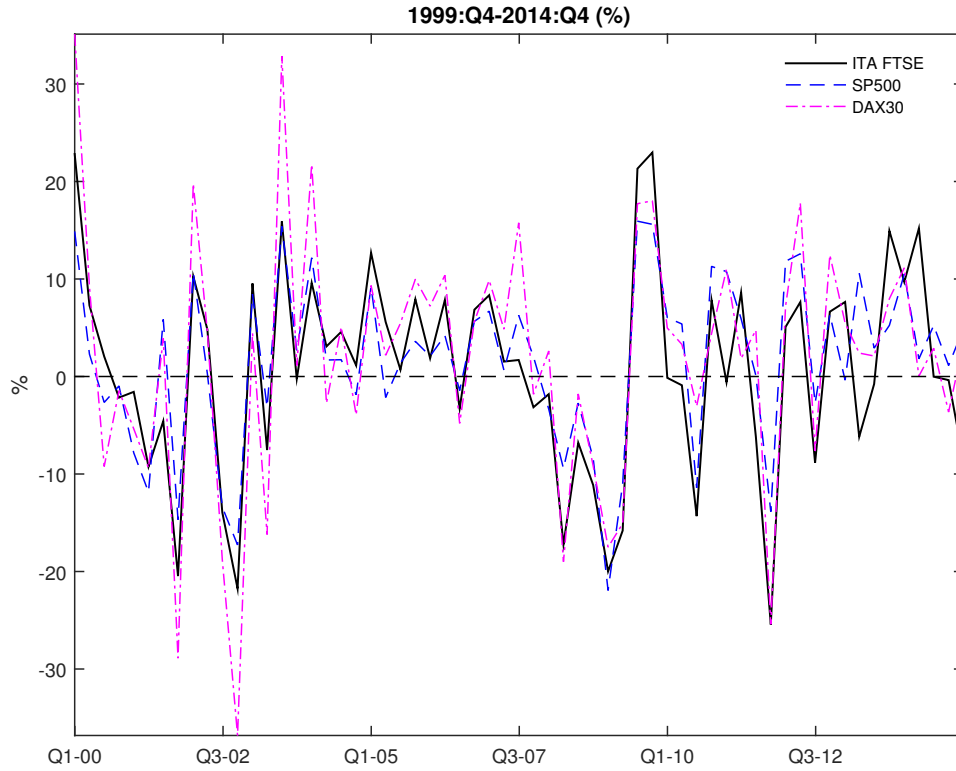
	FTSE-MIB	SP500	DAX30
Mean	0.67	1.63	1.94
Std	10.74	8.62	13.09
Min	-25.45	-21.94	-36.82
Max	22.97	15.93	35.11
AC(1)	0.18	0.13	-0.00
Skew	-0.29	-0.59	-0.38
Kurt	2.95	2.98	4.13
Corr vs. US	0.84	1.00	0.88

This table reports mean, standard deviation, minimum, maximum, first order auto-correlation, skewness and kurtosis for the quarterly total returns on the FTSE-MIB, the S&P 500 and the DAX30. Returns are quarterly and in percentage. Total returns include dividends. The last row reports correlations between each series and the S&P 500. Data are quarterly from Datastream for the period 1999:Q4-2014:Q4.

at the beginning of quarter t and then sells it at the end of the same quarter. Even though the correlation across equity markets is typically very high, we consider the possibility that Italian investors look not only at the past performance of their domestic equity market, but also of foreign stock markets. Therefore, we compute correlation coefficients with respect to the Italian (FTSE-MIB), the US (S&P 500) and the German (DAX 30) equity indices. We report results in table 3. In the last column of the table we also report results from Chien (2014), corresponding to correlations between current US equity mutual fund flows and the US stock market. Note that our sample is shorter than Chien (2014) and covers the period 1999:Q4-2014:Q4.

Correlation coefficients between current equity flows and stock returns in the previous quarter are all positive and range from 0.21 (FTSE-MIB) to 0.09 (S&P500), but smaller than the 0.38 value that Chien (2014) reports for the US. Current equity flows are also positively correlated to stock returns two and three quarters lagged, even though the coefficients are always smaller than for the US. Chien (2014) points out to an interesting feature of US net flows data: the correlation coefficients between current equity flows and future stock returns are negative, even though small in magnitude. The negative correlation implies that, on average, investors buying stocks at times when mutual funds receive positive net inflows will earn on average lower returns in the next three quarters. In our sample, correlation coefficients with respect to future stock returns on the FTSE-MIB are very small, and if anything positive. On the contrary, correlation coefficients with respect to future returns on

Figure 2: Stock returns



This figure plots the quarterly total returns (in percentage) of the Italian FTSE index, the US S&P 500 and the German DAX30. Data are quarterly from Datastream for the sample 1999:Q4-2014:Q4.

Table 3: Correlations between mutual fund flows and stock returns

Stock returns	I	II	III	Chien (2014)
3 quarters ago	0.05	0.10	0.05	0.13
2 quarters ago	0.09	0.10	0.15	0.31
Previous quarter	0.21	0.09	0.17	0.38
Next quarter	0.07	-0.10	-0.08	-0.06
2 quarters later	0.05	-0.02	-0.06	-0.07
3 quarters later	-0.03	-0.04	-0.10	-0.13

The first three columns of the table report correlation coefficients between current net flows to equity mutual funds available to Italian investors and past and future quarterly returns on the FTSE-MIB (I), the S&P 500 (II) and the DAX 30 (III), for the sample 1999:Q4-2014:Q4. The last column of the table reports results in [Chien \(2014\)](#) on the correlation coefficients between current flows and past and future US stock returns for the period 1984:Q1-2014:Q4. Data are from Datastream, Assogestioni and [Chien \(2014\)](#).

the S&P500 and the DAX 30 are negative, and in line with those reported by [Chien \(2014\)](#). [Table 3](#) does not report confidence intervals for the correlation coefficients, which are likely to be large. In fact, several variables beside past stock performance influence net flows, including the level of interest rates, the volatility in the stock market and changes in the taxation of capital income. At the same time, the point estimates of the correlation coefficients confirm a large body of evidence linking past stock market performance and mutual fund net flows ³. Therefore, we do not claim that past stock returns are the sole, or even main, determinants of net flows into equity mutual funds. We are rather interested in evaluating the performance of popular investment strategies that chase trends in stock market performance. In particular, we analyze a return-chasing strategy that times investment on the basis of recent past stock market returns. Is it possible that the differences with respect to the correlation coefficients found in [Chien \(2014\)](#), like the zero or sometime positive correlations with respect to future returns on the FTSE-MIB and that are highlighted in [table 3](#), imply that the profits of return-chasing are larger than those from a buy-and-hold strategy? We investigate next this possibility.

We compare returns from a buy-and-hold and return-chasing strategy over a 5-year holding period⁴. The buy-and-hold strategy invests \$1 at the beginning of period t in the market portfolio and holds the investment for h quarters reinvesting any accrued dividends. In the baseline simulations we fix $h = 20$ so that the holding period corresponds to five years. We denote with $R_{t,h}^{BH}$ the total gross return of buying the market index at the beginning of quarter t and holding it for h quarters. The buy-and-hold (BH) gross total return is:

$$R_{t,h}^{BH} = \prod_{i=0}^{h-1} R_{t+i,1},$$

where $R_{t+i,1}$ is the end-of-period total quarterly return corresponding to buying the market index at the beginning of quarter $t + i$ and holding the investment for just one quarter. If buy-and-hold is a simple passive investment strategy, return-chasing is instead an active strategy that invests every quarter, over a five year horizon, an amount of resources equal to the net flows into mutual funds. Since return-chasing requires buying and selling stocks (or, similarly, buying into a fund or redeeming the fund shares), investors will have to pay transaction costs (i.e., bid/ask spreads and mutual fund entry/exit fees if the investment is channeled through an intermediary). For simplicity, we abstract from these transaction costs that are likely to reduce the profitability of a return-chasing strategy. Therefore, we

³See for example [Warther \(1995\)](#), [Edelen \(1999\)](#), [Frazzini and Lamont \(2008\)](#), [Lou \(2012\)](#), [Ben-Rephael et al. \(2012\)](#), [Friesen and Sapp \(2007\)](#), [Edelen and Warner \(2001\)](#), [Fant \(1999\)](#).

⁴The results we present in this section are robust to a different, shorter or longer, length the holding period. We are happy to provide to these robustness checks upon request.

compute an upper boundary for the returns of a return-chasing strategy that aims at timing the aggregate equity market. Denote with F_t net flows at the beginning of quarter t . In our analysis, at the beginning of each holding-period t , investors start building their portfolios with funds equal to F_t , and then each subsequent quarters they add or subtract resources from their portfolio according to the observed net flows. We denote with $Q_{t,h}$ the total amount of resources invested throughout the holding period:

$$Q_{t,h} = \sum_{i=0}^{h-1} F_{t+i},$$

The value of the investment position V_t evolves according to:

$$V_{t+1+i} = (V_{t+i} + F_{t+i})R_{t+i,1}, \quad (1)$$

with $i = 0, \dots, h-1$. Note that V_t denotes the value of the investment position at the beginning of period t . We can use [1](#) to find the value of the investment position at the end of the holding period:

$$V_{t+h} = V_t \underbrace{\prod_{i=0}^{h-1} R_{t+i,1}}_{R_{t,h}^{BH}} + \sum_{i=0}^{h-1} F_{t+i} \left(\prod_{j=i}^{h-1} R_{t+j,1} \right). \quad (2)$$

In the simulations we set $V_t = 0$, since we assume that investors start with no initial wealth. The second term of equation [2](#) shows that a return-chasing strategy will outperform the buy-and-hold when investors are able to correctly time the market and invest (disinvest) exactly at times when future returns are higher (lower). The return-chasing gross return with horizon h is equal to:

$$R_{t,h}^{RC} = \frac{V_{t+h}}{Q_{t,h}}.$$

Note that return-chasing implicitly assumes no constraints on short-sales. Contrary to buy-and-hold which is a long-only strategy, if in a given quarter net flows are negative enough to offset the starting period investment balance, then the investment position of a return-chasing strategy turns negative, indicating a short-sale position that profits from a decline in stock market prices. If net flows are on average positively correlated to past stock returns, than a return-chasing strategy tends to invest more in the stock market after quarters of high returns.

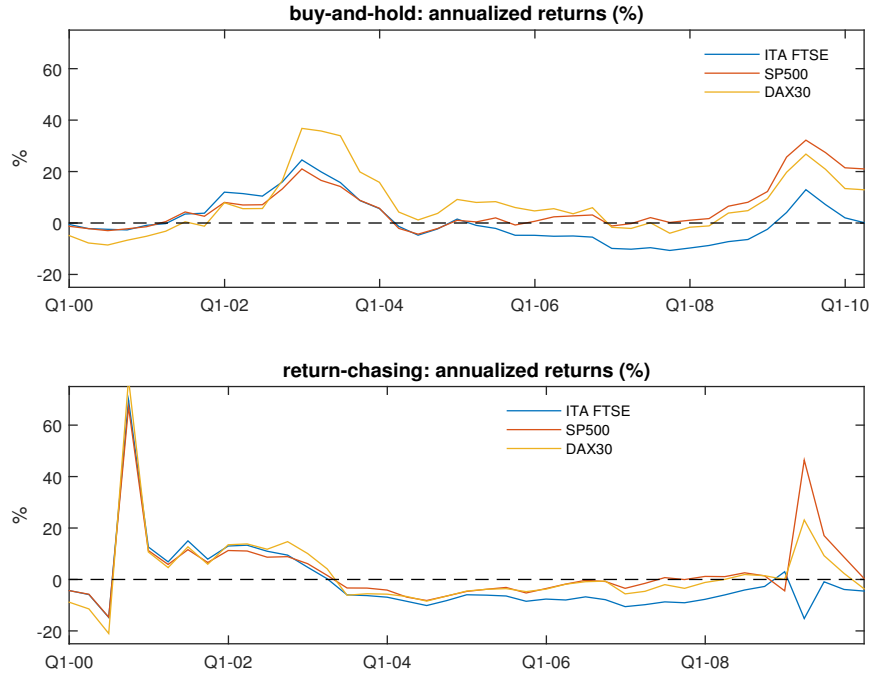
The top panel of figure [3](#) plots the annualized returns from the buy-and-hold strategies that go long the FTSE-MIB, the S&P 500 and the DAX 30 and hold the investment for

twenty quarters. Long-returns on the three indices are clearly highly correlated. The main difference is related to the effects of the subprime mortgage crisis first, and then of the Eurozone sovereign debt crisis. The Italian stock market index, the FTSE-MIB, highly loaded on bank stocks, has been strongly negatively affected by these twin-crises and long-returns in the period 2003:Q4-2008:Q3 are always negative (except for one single quarter: 2004:Q3). On the contrary, the US and German stock markets have quickly recovered the losses from the financial crisis. In fact, returns are sometimes positive and sometime negative in the period 2003:Q4-2008:Q1, and then large and positive in the last part of the sample⁵. Not surprisingly, investors who had invested in equity in the aftermath of the burst of the Dot-com bubble, or of the bottom of the subprime-mortgage crisis, earned very large positive returns in each of the three markets. In the bottom panel of figure 3 we report the annualized returns from the return-chasing strategy. Since net inflows can be negative, a return chasing strategy might involve large short-positions which are not always available to all investors. Since returns of the three indices are highly correlated, it does not come as a surprise that the profits of return-chasing are also highly correlated. What is more striking is the fact that, with the exception of the periods 2000:Q3-2003Q2 and 2008:Q1-2009:Q1, long-returns are mostly close to zero or negative. Figure 4 plots the difference in annualized returns between return-chasing and buy-and-hold. The series are mostly negative, with a significant exception being the period 2000:Q1-2001:Q2 for investment in the S&P500 and the DAX 30. On the contrary, a return-chasing strategy on the FTSE-MIB outperformed a simple buy-and-hold strategy for a long stretch of data that starts in 2005:Q1 and ends in 2008:Q4. Note that the outperformance is mostly due to the poor performance of the Italian stock market. In fact, in this stretch of time returns from buy-and-hold are negative, and net flows into equity mutual funds are often negative.

In table 4 we report summary statistics on the return differences between return-chasing and buy-and-hold for investments on the FTSE-MIB, the S&P 500 and the DAX 30. If we consider the sample averages, the return-chasing strategies never outperform buy-and-hold. The largest difference is for investment on the DAX 30: in this case buy-and-hold will return investors approximately 5% per year. This means that the average cumulative difference over a five year period is as large as 25%. Differences for investment in the FTSE-MIB and the S&P 500 are a bit smaller, respectively equal to 2.16% and 2.96%. In the last row of the table, we report the fraction of quarters in which the return-chasing strategy outperformed the buy-and-hold in the sample. Interestingly, for the FTSE-MIB return-

⁵In the period 2003:Q4-2008:Q1, the lowest quarterly return for the S&P500 is -4.33% in 2004:Q1, while the highest is 3.12% in 2006:Q3. For the DAX30 the lowest quarterly return is -3.97% in 2007:Q3, while the highest 9.15% in 2004:Q3.

Figure 3: Returns from buy-and-hold and return-chasing

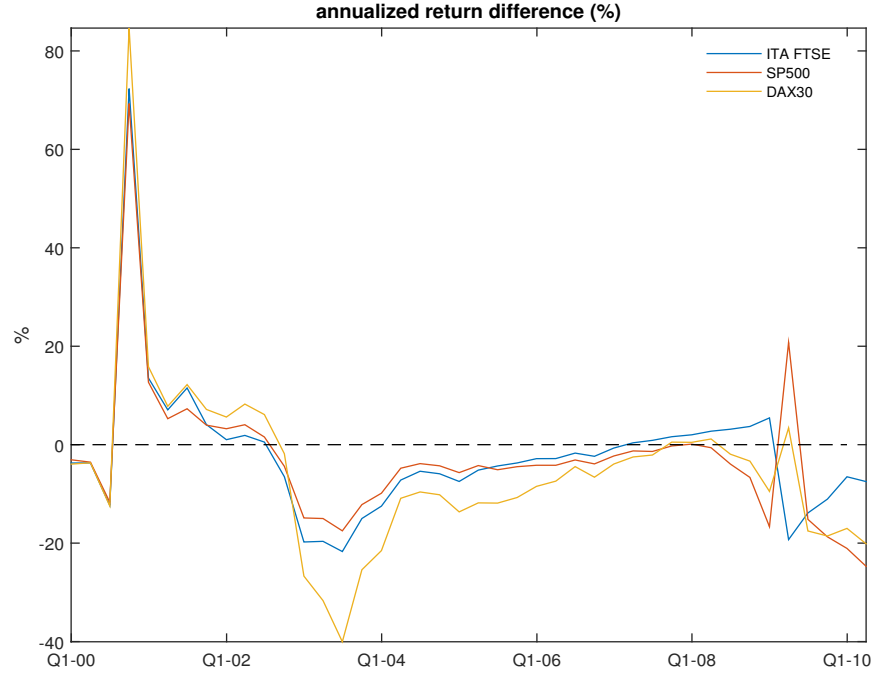


In the top panel of the figure we plot the annualized returns from a buy-and-hold investment strategy on the FTSE MIB, the S&P 500 and the DAX30. In the bottom panel, we plot the annualized returns from a return-chasing strategy on the same stock market indices. A return-chasing strategy times investment according to past stock returns. For details on the return-chasing strategy refer to section Section:Results. We assume a holding period of twenty quarters. The sample is 1999:Q4-2014:Q4. Data are quarterly from Datastream and Assogestioni.

chasing beat the buy-and-hold in approximately 40% of the quarters in the sample, while only in approximately 23% quarters for the S&P 500 and 28% for the DAX 30. In table 4 we simply compare unconditional average returns of the two strategies and we do not take into consideration possible differences in risk. If we look at the Sharpe-ratios of the two strategies, we note that those for buy-and-hold are approximately twice as large as those for return-chasing. Therefore, not only a return-chasing investment strategy under-performs a simply buy-and-hold, but it is also much more risky.

As we discussed before, the return-chasing allows for short positions. Since these strategies are not always available to non sophisticated investors and they can be expensive, in the last three columns of table 4 we also report summary statistics of the differences in returns between return-chasing and buy-and-hold when we assume investors cannot take short-position. In particular, we assume that over the holding period the size of the investment position cannot be negative so that when quarterly net flows are negative investors can cash out at most the outstanding value of their assets. When we exclude the possibility of short-selling, results change dramatically for investment in the FTSE-MIB: now

Figure 4: Return Difference between Return-Chasing and Buy-and-Hold



This figure plots the return difference between annualized returns from a return-chasing and a buy-and-hold investment strategy on the FTSE-MIB, the S&P 500 and the DAX30. A return-chasing strategy times investment according to past stock returns. For details on the return-chasing strategy refer to section Section:Results. We assume a holding period of twenty quarters. The sample is 1999:Q4-2014:Q4. Data are quarterly from Datastream and Assogestioni.

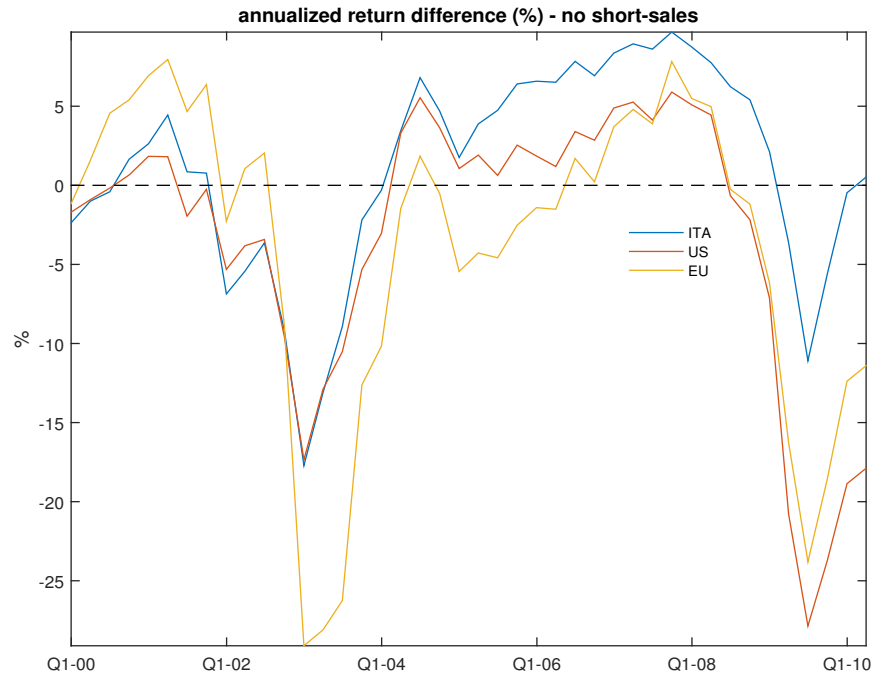
return-chasing outperforms buy-and-hold in about 61% of the quarters in the sample on by approximately 1% per year. On the contrary, buy-and-hold beats return-chasing for investments in the S&P 500 and the DAX 30 also when we exclude the possibility of short-selling.

Table 4: Return Difference between Return Chasing and Buy-and-Hold

	FTSE MIB	S&P500	DAX30	FTSE MIB NS	S&P500 NS	DAX30 NS
Mean	-2.16	-2.96	-5.15	1.06	-3.18	-3.70
Std	14.30	14.42	18.41	6.60	8.69	9.98
Skewness	3.31	3.00	2.59	-0.89	-1.30	-1.17
Kurtosis	18.78	16.32	14.79	3.23	3.73	3.50
% quarters	38.10	23.81	28.57	61.90	47.62	42.86

In this table we report mean, standard deviation, skewness, kurtosis of the return difference from a return-chasing and a buy-and-hold investment strategy using a rolling holding period of twenty quarters. In the last row we also report the percentage of quarters in which the return-chasing strategy outperforms a simple buy-and-hold strategy. Returns are annualized. The first three columns consider investment strategies on the FTSE-MIB, the S&P 500 and the DAX30 stock indices, assuming no limit to short-sales and leverage. The last three columns consider investment strategies on the same assets, assuming a short-sale constraint. The sample is 1999:Q4-2014:Q4. Data are from Datastream and Assogestioni.

Figure 5: Return Difference between Return-Chasing and Buy-and-Hold (no short-sales)



This figure plots the return difference between annualized returns from a return-chasing and a buy-and-hold investment strategy on the FTSE MIB, the S&P 500 and the DAX30 when short-sales are not allowed. A return-chasing strategy times investment according to past stock returns. For details on the return-chasing strategy refer to section 2. We assume a holding period of twenty quarters. The sample is 1999:Q4-2014:Q4. Data are from Datastream and Assogestioni.

In figure 5 we report the return differences between return-chasing and buy-and-hold when short-sales are not allowed. The big difference with respect to the case in which short-sales are allowed (figure 4) occurs on the occasion of the burst of the so called Dot-Com Bubble in 2001. In this period, investors pulled out large amounts of savings from equity mutual funds. Therefore, a return-chasing strategy went short equity and took advantage of the large drop in the stock market. If short-sales are not allowed, investors are not able to obtain these very large returns as we can see comparing figures 4 and 5.

Since we have data on mutual fund net equity flows starting in 1989 at annual frequency, we repeat our analysis for this longer sample to verify that results do not depend on a short-sample. In table 5 we report correlation coefficients between mutual fund flows and stock returns with one-, two-, and -three years leads and lags. The stylized facts uncovered on quarterly data are confirmed also for the lower frequencies. In fact, correlation coefficients with past stock returns are larger, while those with respect to future returns are more negative. With the exception of the DAX 30, the effect of past stock returns on net flows disappears after two years. Correlations of current net flows with future stock returns is mostly negative and it increase in absolute terms with the horizon. In particular, correlations

with next year returns are slightly positive (0.11) for the FTSE-MIB, and negative but close to zero for the S&P 500 and the DAX 30. Correlations with returns after two and three years go from -0.22 to -0.51.

Table 5: Correlations between mutual fund flows and stock returns (annual)

Stock returns	I	II	III	Chien (2014)
3 years ago	0.03	0.25	0.02	0.13
2 years ago	0.31	0.39	0.26	0.31
Previous year	0.47	0.31	0.21	0.38
Next year	0.11	-0.06	-0.06	-0.06
2 years later	-0.22	-0.32	-0.24	-0.07
3 years later	-0.32	-0.48	-0.51	-0.13

The first three columns of the table report correlation coefficients between current flows of Italian mutual funds and past and future returns on the FTSE MIB (I), the S&P 500 (II) and the DAX30 (III), for the period 1985-2014. The last column of the table copies results in [Chien \(2014\)](#) on the correlation coefficients between current flows and past and future US stock returns for the period 1984:Q1-2014:Q4. Data are from Datastream, Assogestioni and [Chien \(2014\)](#).

In [table 6](#) and in [figure 6](#) we report the return difference between return-chasing and buy-and-hold on the longer sample with data at annual frequency. The holding period is five years. For the baseline case in which there is no restriction to short-sales results from the shorter quarterly sample are confirmed: return-chasing on average under-performs buy-and-hold for investments on the FTSE-MIB, the S&P 500 and the DAX 30. The differences are large: for example, in the case of the S&P 500 the annual average difference in returns is approximately equal to 8%, implying a cumulative return difference of about 40%. For investments in any of the three equity markets return-chasing under-performs a simple buy-and-hold strategy also when we introduce short-sale constraints. As for the shorter-sample, return-chasing fares better against buy-and-hold when we consider an investment on the FTSE-MIB. In fact, return-chasing over-performs buy-and-hold in about one third of the years in the sample in the baseline case, and in about three fifth of the years when we consider short-sale constraints.

3 Conclusions

In this paper we compare return-chasing and buy-and-hold investment strategies. A return-chasing strategy follows trends in the stock market and times investment according to past stock returns. We use net flows into equity mutual funds available to Italian investors to

Figure 6: Return Difference between Return-Chasing and Buy-and-Hold (annual data)



This figure plots the return difference between annualized returns from a return-chasing and a buy-and-hold investment strategy on the FTSE MIB, the S&P 500 and the DAX30. A return-chasing strategy times investment according to past stock returns. For details on the return-chasing strategy refer to section 2. We assume a holding period of twenty quarters. The sample is 1989-2014. Data are annual from Datastream and Assogestioni.

Table 6: Return Difference between Return Chasing and Buy-and-Hold (annual data)

	FTSE MIB	S&P500	DAX30	FTSE MIB NS	S&P500 NS	DAX30 NS
Mean	-4.55	-8.55	-6.54	-3.67	-8.10	-5.41
Std	20.01	19.25	21.43	12.79	12.64	12.72
Skewness	1.46	1.68	1.25	-1.02	-0.93	-0.59
Kurtosis	6.67	7.68	6.01	2.77	3.10	2.45
% years	33.33	14.29	23.81	57.14	38.10	38.10

In this table we report the mean, standard deviation, skewness, kurtosis of the return difference from a return-chasing and a buy-and-hold investment strategy using a rolling holding period of 5 years. In the last row we also report the percentage of years in which the return-chasing strategy outperforms a simple buy-and-hold strategy. Returns are annual. The first three columns consider investment strategies on the FTSE MIB, S&P 500 and DAX 30 stock indices, assuming no limit to short-sales and leverage. The last three columns consider investment strategies on the same assets, assuming a short-sale constraint. Data are annual for the period 1989-2014 from Datastream and Assogestioni.

define the exact timing of the return-chasing strategy. The correlation between net flows and past stock returns is positive, so that investors invest more (less) in the stock market after good (bad) past stock market returns. We show that return-chasing is costly for investors.

Over the period 1999:Q4-2014:Q4 return-chasing under-performed a buy-and-hold strategy on the FTSE-MIB, the S&P500 and the DAX30 by as much as 5% per year. Transaction costs and mutual funds' entry and exit fees imply that the the return difference between the two strategies is even larger. These results indicate that most investors would be better off following passive investment strategies.

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