



# A Portrait of Hedge Fund Investors: Flows, Performance and Smart Money

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# Hedge fund flows and performance

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In this paper we study the flow-performance interrelation in hedge funds by separating investment and divestment decisions of investors.

- Focus on asymmetries between these two decisions and the relevant time-horizon.
- We also explore several economic implications for both investors and hedge funds,
- Is money to hedge funds smart? That is, are hedge fund investors able to identify those funds that subsequently perform well?

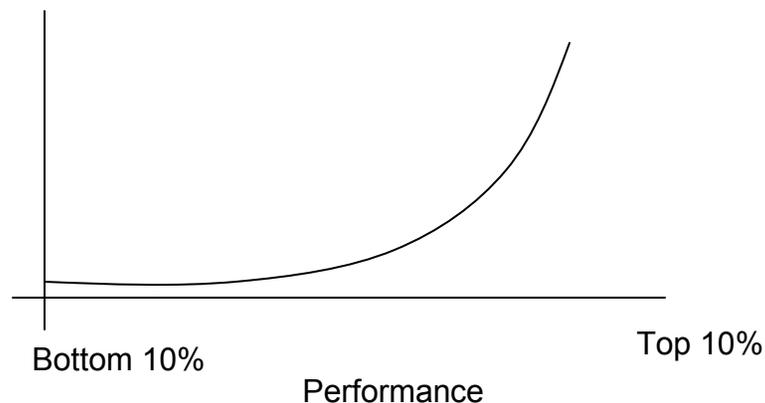
# Motivation: flows and performance

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For mutual funds as well as hedge funds at the *annual* level, a convex relationship is reported between money flows and past performance (Sirri & Tufano, 1998, Agarwal, Daniel & Naik, 2003).

- The top 10-20% attract large cash flows.
- The bottom deciles experience zero or limited outflows.

Money Flows



## Motivation: flows and performance

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So, investors appear to be chasing good performance. However, there is only weak evidence of performance persistence for mutual funds (Carhart, 1997). (If any, persistence is mostly located among the poor performers.)

For hedge funds, there is no or little evidence of persistence at annual horizons (e.g. Brown, Goetzmann, Ibbotson [JB, 1999]).

Berk and Green [2004] reconcile these two findings: the lack of persistence is evidence of competition among investors. That is, persistence is competed away.

## And at the quarterly level?

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For hedge funds at the *quarterly* level, this may be different.

- On the one hand, strong persistence in performance is reported (e.g. Agarwal & Naik [JFQA, 2000], Baquero, Ter Horst, Verbeek [JFQA, 2005] ), suggesting a lack of competition among hedge fund investors (and a weaker flow-performance relationship).
- On the other hand, liquidity restrictions and searching costs prevent a quick and easy reallocation of hedge fund capital.

# Motivation

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These findings motivate us to investigate the interrelationships between hedge fund flows and their performance at the quarterly level.

- Is quarterly persistence the result of a lack of competition among hedge fund investors (i.e. a weaker flow-performance relation than at annual horizons)?
- And to what extent are flows to/from hedge funds indicative of their future (relative) performance?

## In this paper

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We estimate several models explaining quarterly cash flows to/from hedge funds, controlling for a wide range of other factors.

- Examine dynamic impact of past performance
- Take account of liquidity restrictions (how quickly can investors adjust their investments in reaction to past performance?)
- Allow for asymmetries between investing and divesting.
- We also explore several economic implications for both investors and hedge funds (i.e. is money to hedge funds smart?)

## Main findings

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- At the quarterly horizon the performance-flow relationship is approximately linear; outflows respond strongly and quickly to past poor performance.
- We identify important asymmetries in the decisions to invest and divest, in terms of response lag times and the impact of fund characteristics (size, age, offshore,...).
- There is no evidence of smart money. Hedge fund investors fail in their allocation by investing mostly in funds that subsequently perform poorly. On the other hand, they respond fast and appropriate by de-allocating from the persistent losers.

# Outline of what follows

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- Some background on the hedge fund industry
- Data and variables
- Empirical results
  - Base specification of a model explaining cash flows
  - A model incorporating liquidity restrictions
  - A regime switching model, to separate positive and negative cash flows
- Economic implications
- Summary and conclusions

# Some background on hedge funds

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A simple definition :

1. A hedge fund is a private investment pool,
2. with limited regulation,
3. that combines both long and short positions...
4. in a leveraged basis,
5. charging a performance-based fee
6. and managed by a general partner.
7. Hedge funds offer limited liquidity to their clients

## Data and variables

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We use a sample of 752 individual funds (7457 fund-period obs.)

- Source: Tass Management Limited
- Period 1994Q4 – 2000Q1 (22 quarters)
- From which 163 liquidated and 86 self-selected out of the database
- We exclude funds-of-funds and closed-end funds

We use growth rates and dollar flows, both assuming flows take place at the end of quarter  $t+1$

$$CashFlow_{t+1} = \frac{Assets_{t+1} - Assets_t}{Assets_t} - r_{t+1}$$

$$DollarFlow_{t+1} = Assets_{t+1} - Assets_t (1 + r_{t+1})$$

**Table II**  
**Distributions of Flows and Assets under Management**  
**in the Hedge Fund Industry**

This table shows the cross-sectional distribution of cash flows and total net assets under management in our sample of 752 open-end hedge funds from 1994Q4 till 2000Q1. Cash flows are computed as the change in total net assets between consecutive quarters corrected for reinvestments. A growth rate is calculated as relative cash flows with respect to the fund's TNA of the previous quarter.

Percentile	Cash Flows (growth rate)	Cash Flows (dollars)	Total Net Assets (million dollars)
99%	1.0506	60572000	733.3959
95%	0.3611	17720000	319.7788
90%	0.1986	7833357	175.0006
75%	0.0566	1068212	63.12327
50%	0.0000	-93.943	19.68958
25%	-0.0606	-1032387	5.489787
10%	-0.1747	-6207153	1.651972
5%	-0.2863	-14200000	0.860888
1%	-0.6003	-61684000	0.24526

## Distribution of flows and TNA

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The distributions of cash flows appear to be relatively symmetric, similar to findings in the pension fund industry.

The .99 percentile corresponds to an inflow of 60 million \$, the .01 percentile to an outflow of 61 million \$.

For growth rates, the .95 percentile corresponds to a growth in TNA of 36%, while the .05 percentile has a negative growth of -29%.

About half of the funds experience positive cash flows.

# Relevant variables

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What may affect money flows?

- Performance: raw returns, relative rankings
- Risk: standard deviation, semi-deviation
- Risk-return measures: Sharpe ratio, upside potential ratio
- Size, fund age
- Incentive fees, management fees
- Managerial investment, off shore, use of leverage
- Lagged flows
- Style dummies, time dummies

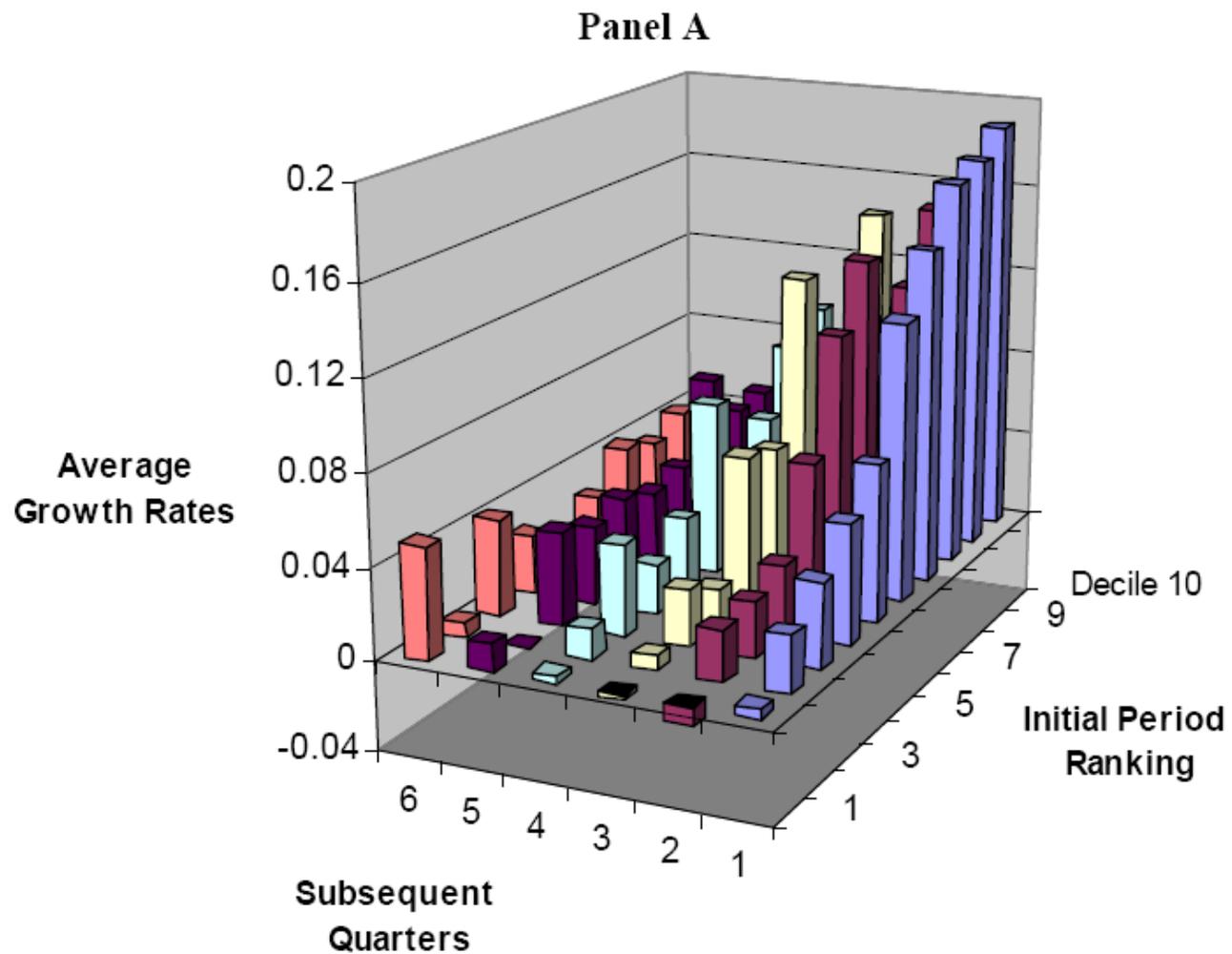
# Modeling flows

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1. Base specification, explaining growth rates or dollar flows.
2. Incorporating the impact of liquidity restrictions (redemption periods, notice periods).
3. Allowing for asymmetries between net inflows and outflows, using a switching regression model.

# Average % flows across deciles

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## Base specification (explaining growth rates)

Parameters	Estimates		Parameters	Estimates	
Intercept	0.2059	(3.07)	Offshore	0.0052	(0.66)
Rank lag 1	0.1300	(8.91)	Incentive Fees	-0.0015	(-3.21)
Rank lag 2	0.0856	(6.35)	Management Fees	-0.0074	(-1.58)
Rank lag 3	0.1064	(7.09)	Personal Capital	0.0064	(0.71)
Rank lag 4	0.0601	(4.11)	Leverage	0.0071	(0.93)
Rank lag 5	0.0319	(2.53)	Upside Potential Ratio	0.0009	(4.8)
Rank lag 6	-0.0028	(-0.22)	Emerging Markets	-0.0391	(-2.83)
ln(TNA)	-0.0187	(-5.27)	Equity Market Neutral	0.0024	(0.17)
ln(AGE)	-0.0195	(-3.17)	Event Driven	-0.0051	(-0.41)
Flows lag 1	0.0435	(2.49)	Fixed Income Arbitrage.	-0.0331	(-1.42)
Flows lag 2	0.0418	(2.98)	Global Macro	-0.0283	(-1.46)
Flows lag 3	0.0299	(1.75)	Long/Short Equity	-0.0391	(-3.48)
Flows lag 4	0.0154	(1.46)	Managed Futures	-0.0281	(-1.85)
	$R^2$	0.0702			
	Number of observations	7425			

## Base specification, explaining growth rates

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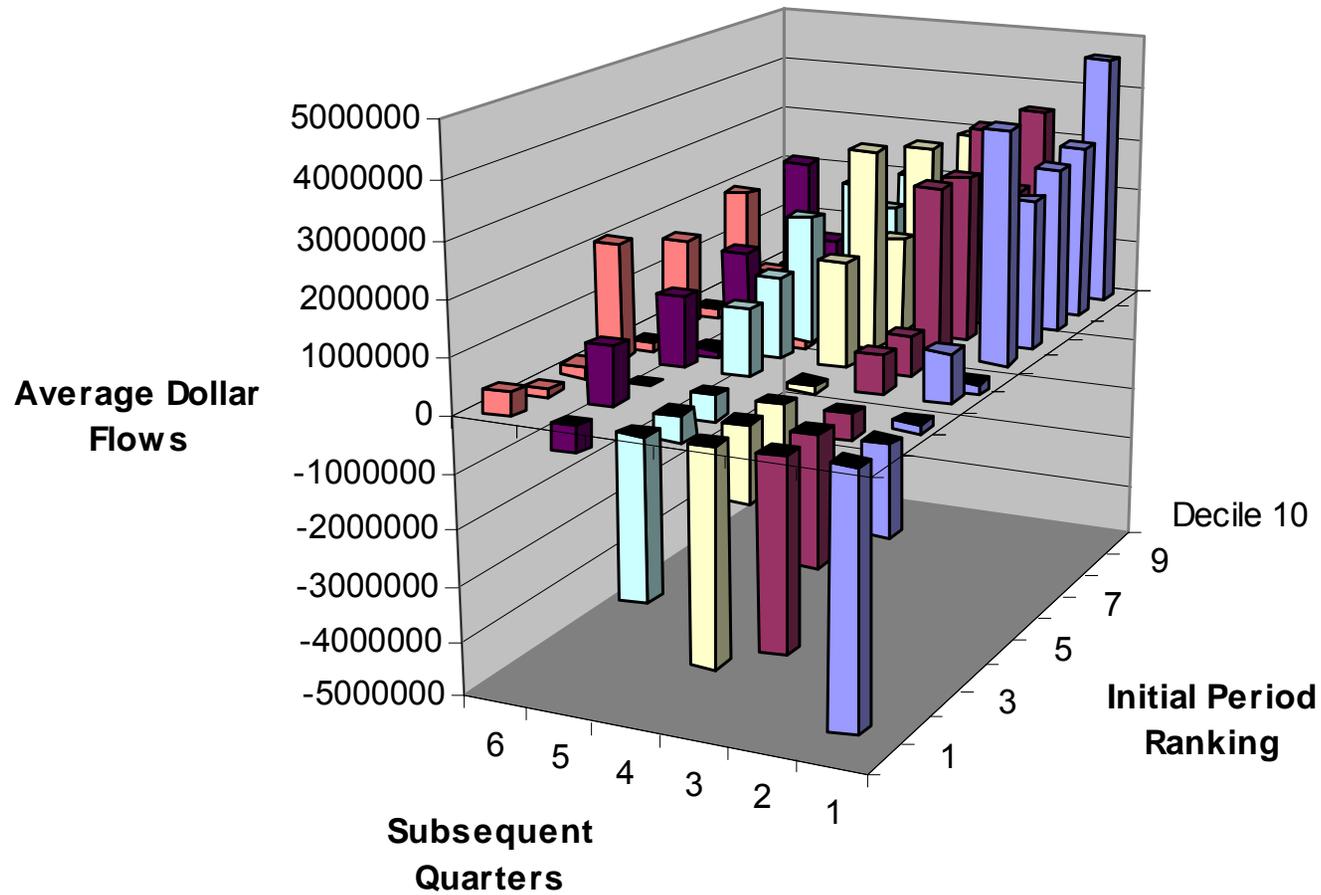
- Based on pooled least squares; robust to Fama-MacBeth estimation.
- All  $t$ -statistics are based on robust standard errors.
- Coefficients for time dummies are not reported.
- Flows are sensitive to historical relative performance, impact reduces with lag length.
- Ranks capture the impact of past performance better than do raw returns.
- An improvement of a fund from the 25<sup>th</sup> to 75<sup>th</sup> percentile is associated with a significant 6.5% growth in flows in the next quarter. In the long-run, this increases to 25%.

# Base specification, explaining growth rates

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- The linear relationship between performance and flows appears to be robust. (We tested for non-linearities, allowing for kinks at each decile, we experimented with two and three segment piecewise linear regression, and added the square of lagged ranks.)
- Size, fund age and fees have a significant negative impact.
- Upside potential ratio has a significant positive impact (making other risk measures redundant).
- Significance of lagged flows indicates persistence.

## Average dollar flows across ranks Over subsequent quarters



# Base specification (explaining Dollar flows)

Parameters	OLS estimates	Parameters	OLS estimates
Intercept	1.50E+07 (1.07)	Offshore	-1000580 (-1.48)
Rank lag 1	9062120 (4.70)	Incentive Fees	-199067.1 (-2.61)
Rank lag 2	7134531 (4.34)	Management Fees	401933.2 (1.36)
Rank lag 3	5995536 (3.04)	Personal Capital	-815875.9 (-1.51)
Rank lag 4	2760659 (1.62)	Leverage	-184713 (-0.27)
Rank lag 5	-1017801 (-0.63)	Upside Potential Ratio	31060.62 (2.01)
Rank lag 6	-1510093 (-0.97)	Emerging Markets	-2008305 (-1.50)
ln(TNA)	-840701.9 (-1.34)	Equity Market Neutral	-515577.2 (-0.43)
ln(AGE)	-2512114 (-2.75)	Event Driven	-1023625 (-0.81)
Flows lag 1	3705023 (4.47)	Fixed Income Arbitrage.	-3351667 (-2.75)
Flows lag 2	2548164 (3.54)	Global Macro	-1.95E+07(-1.35)
Flows lag 3	1585205 (2.77)	Long/Short Equity	-2606461 (-2.28)
Flows lag 4	603907 (1.67)	Managed Futures	-2312161 (-2.00)
R <sup>2</sup>	0.0325		
Number of observations	7425		

## Base specification, explaining dollar flows

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- Again, lagged performance is a significant determinant of dollar flows, with a lower impact at larger lags length.
- Size does not explain dollar flows (but was important in explaining growth rates).
- Younger funds experience less dollar flows.
- Off shore dummy is insignificant.

## Interacting lagged ranks and limits to liquidity

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In the hedge fund industry liquidity restrictions are important, particularly for redemptions.

- Redemption frequencies (daily, monthly, quarterly, annually)
- Redemption notice periods (0, 1 up to 180 days).

The decision of an investor to subscribe or redeem in response to past performance becomes effective with a substantial delay.

We capture this effect by interacting lagged ranks and limits to liquidity.

# Percentage of funds for different combinations of redemption and notice periods

Redemption periods	Redemption notice periods							
	No notice period	From 1 day up to 1 day	From 1 day up to 7 days included	From 7 days up to 15 days included	From 15 days up to 30 days included	From 30 days up to 90 days included	From 90 days up to 180 days included	From 180 days up to 365 days included
1	0.43	0.06	0.18	0.24				
7	0.91	0.79	2.62	0.24	0.18			
15		0.12	0.30	0.30		0.06		
30	0.79	1.22	6.51	18.20	20.57	5.23		0.06
90		0.06	0.55	2.43	15.09	11.38	0.30	
183				0.06	1.52	2.37	0.06	
365					1.77	4.99	0.37	

## Model of cash flows subject to liquidity restrictions

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Parameters	Estimates	
Intercept	0.2018	(3.01)
Rank lag 1 Unrestricted	0.1327	(8.63)
Rank lag 2 Unrestricted	0.0844	(5.85)
Rank lag 3 Unrestricted	0.1084	(6.76)
Rank lag 4 Unrestricted	0.0625	(4.00)
Rank lag 5 Unrestricted	0.0290	(2.16)
Rank lag 6	-0.0027	(-0.20)
Rank lag 1 Restricted	0.1067	(4.42)
Rank lag 2 Restricted	0.0952	(3.26)
Rank lag 3 Restricted	0.0876	(4.11)
Rank lag 4 Restricted	0.0322	(1.20)
Rank lag 5 Restricted	0.0641	(2.47)
ln(TNA)	-0.0185	(-5.23)
ln(AGE)	-0.0195	(-3.16)
Other control variables...		
R2	0.0702	
Number of observations	7425	

# Modeling inflows and outflows separately

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- Given these restrictions, and keeping in mind the differences between the investment (manager selection, due diligence,...) and divestment processes (e.g. post-investment monitoring,...), it is not clear whether inflows and outflows respond with equal sensitivity to good and bad performance.
- To investigate this, we estimate two separate equations explaining negative and positive cash flows, combined with a binary equation explaining the sign.

# A switching regression model

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We observe either  $Net\ InFlows_{n,it}$  when  $S_{it} = 1$   
or  $Net\ OutFlows_{d,it}$  when  $S_{it} = 0$ ,  
but never both.

We model both variables by means of a truncated regression model, where the truncation is determined by a binary probit model.

$$S_{i,t}^* = \alpha + \sum_{j=1}^6 \beta_{1,j} \cdot (rnk_{i,t-j}) + \beta_2 \cdot \ln(NAV_{i,t-1}) + \beta_3 \cdot \ln(AGE_{i,t-1}) + \sum_{j=1}^4 \beta_{4,j} \cdot (Flow_{i,t-j}) + \gamma' \cdot X_{i,t} + \lambda_i + \eta_{i,t}$$

where :

$S_{it} = 1$  if cashflow  $> 0$  in quarter t ( $S_{it}^* > 0$ )

$S_{it} = 0$  otherwise

## Estimation of the regime switching model

Parameters	Probit model explaining positive and negative cash flows		Estimation using a truncated sample for CFlows <0		Estimation using a truncated sample for CFlows > 0	
Intercept	-0.3662	(-1.64)	-0.1530	(-2.69)	0.6268	(2.8)
Rank lag 1 Unrestricted	0.7536	(13.23)	0.1355	(3.83)	0.1481	(1.57)
Rank lag 2 Unrestricted	0.5598	(9.72)	0.0976	(3.62)	0.0713	(1.01)
Rank lag 3 Unrestricted	0.5180	(8.99)	0.0692	(2.82)	0.1596	(2.68)
Rank lag 4 Unrestricted	0.3028	(5.26)	0.0466	(2.85)	0.0812	(1.73)
Rank lag 5 Unrestricted	0.2051	(3.57)	0.0337	(2.58)	0.0218	(0.64)
Rank lag 6	0.0362	(0.65)	0.0085	(0.89)	-0.0201	(-0.86)
Rank lag 1 Restricted	0.5934	(3.75)	0.0811	(2.3)	0.1444	(1.9)
Rank lag 2 Restricted	0.4953	(3.15)	0.0998	(2.96)	0.1159	(1.74)
Rank lag 3 Restricted	0.8069	(4.92)	0.1430	(3.27)	0.0945	(1.02)
Rank lag 4 Restricted	0.4891	(2.84)	0.0565	(1.79)	0.0309	(0.45)
Rank lag 5 Restricted	0.1184	(0.70)	0.0406	(1.54)	0.0652	(1.61)
Ln(TNA)	-0.0166	(-1.59)	0.0002	(0.09)	-0.0387	(-5.63)
Ln(AGE)	-0.1763	(-5.78)	0.0070	(0.77)	-0.0516	(-2.17)
Offshore	-0.1338	(-3.67)	-0.0497	(-5.65)	0.0455	(2.33)
Other control variables...						
Pseudo R <sup>2</sup>	0.1037		0.0806		0.066	
Number of observations	7195		3542		3653	
Chi <sup>2</sup> (51)	847.59					

Parameters	Probit model explaining positive and negative cash flows		Estimation using a truncated sample for CFlows <0		Estimation using a truncated sample for CFlows > 0	
Incentive Fees	-0.0040	(-1.63)	-0.0019	(-5.04)	-0.0018	(-1.7)
Management Fees	-0.0154	(-0.85)	-0.0041	(-1.35)	-0.0047	(-0.59)
Personal Capital	-0.0492	(-1.31)	0.0038	(0.54)	-0.0015	(-0.09)
Leverage	0.0213	(0.53)	0.0124	(1.84)	0.0088	(0.69)
Upside Potential Ratio	0.0078	(1.62)	0.0024	(3.98)	0.0008	(2.93)
Emerging Markets	-0.1521	(-2.27)	-0.0142	(-1.17)	-0.0617	(-2.13)
Equity Market Neutral	-0.0125	(-0.20)	-0.0042	(-0.42)	0.0103	(0.45)
Event Driven	0.1626	(2.74)	0.0152	(1.32)	-0.0146	(-0.5)
Fixed Income Arbitrage.	-0.2611	(-1.86)	0.0132	(0.71)	-0.0948	(-1.78)
Global Macro	0.1658	(1.57)	-0.0279	(-1.24)	-0.0272	(-0.83)
Long/Short Equity	-0.0356	(-0.71)	-0.0154	(-1.91)	-0.0610	(-3.16)
Managed Futures	-0.1129	(-1.99)	-0.0242	(-2.24)	-0.0391	(-1.17)
Generalized Residual from Probit Model			0.1981	(2.61)	0.1605	(0.85)
Number of observations	7195		3542		3653	
Pseudo R <sup>2</sup>	0.1037		0.0806		0.066	
Chi <sup>2</sup> (51)	847.59					

# Modeling inflows and outflows separately

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- The generalized residual of the probit model accounts for the truncation.
- The probability to have positive cash flows is strongly affected by past performance.
- The investor's decision is strongly driven by the most recent quarterly performance, the effect becoming smaller with each lag.
- Other significant factors: age (-), lagged flows (+), offshore (-).

# Modeling inflows and outflows separately

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- In the model explaining positive cash flows many explanatory variables are statistically insignificant.
- For negative cash flows many performance rank variables are significant.
- The control variables also reveal important asymmetries.
- Size: irrelevant for negative flows, significantly negative for positive flows. Age: negative for positive flows. Off shore: significantly negative for negative flows, significantly positive for positive flows. Incentive fees.

## Estimation of the regime switching model (annual horizons)

Parameters	Probit model explaining positive and negative cash flows		Estimation using a truncated sample for CFlows <0		Estimation using a truncated sample for CFlows > 0	
<b>Panel 1 : Annual Flows (N=6408 obs., from which 3147 are negative cash flows)</b>						
Previous one-year rank	1.1093	(18.57)	0.2028	(2.24)	1.2461	(3.04)
Ln(TNA)	-0.0525	(-4.77)	-0.0144	(-2.65)	-0.2026	(-6.62)
<b>Panel 2 : Annual Flows (N=6408 obs., from which 3147 are negative cash flows)</b>						
One-quarter rank lag 1	0.8738	(14.96)	-0.0150	(-0.28)	0.8356	(3.03)
One-quarter rank lag 2	0.6871	(11.78)	-0.0312	(-0.72)	0.7447	(3.22)
One-quarter rank lag 3	0.4362	(7.47)	0.0149	(0.50)	0.6553	(3.86)
Ln(TNA)	-0.0458	(-4.06)	-0.0046	(-1.14)	-0.1966	(-7.33)

## Quarterly versus annual horizons

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- Quarterly outflows are strongly sensitive to past year performance, in contrast to quarterly inflows.
- However, annual inflows are strongly sensitive to past year (and past quarter) performance.
- Apparently, looking at annual horizons masks an immediate and sustained response of major withdrawals of money when funds perform poorly.
- Our results also reveal a slow reaction of inflows to short-term past performance (searching costs, infrequent subscription periods).

# Economic implications

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We study the performance of the portfolio of hedge fund investors and the investors' ability to select hedge funds.

Three questions arise:

1. How successful hedge fund investors are as a result of the asymmetric response to bad and good performance? (Smart money evidence?)
2. Given the slow response of inflows to past performance, to what extent can investors exploit predictability patterns in the short run?
3. The fast response of outflows to bad performance suggests an effective punishing mechanism. What are the implications for fund survival?

## What do we do in this part?

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- Analyze the performance of four portfolios of hedge funds, based on their cash flows, to investigate whether funds that receive (more) money perform better than those that lose (more) money (cf. Gruber, JF 96, Zheng, JF 99).
- We analyze the performance and other characteristics of funds that receive large dollar flows, or large percentage flows.

# The four portfolios

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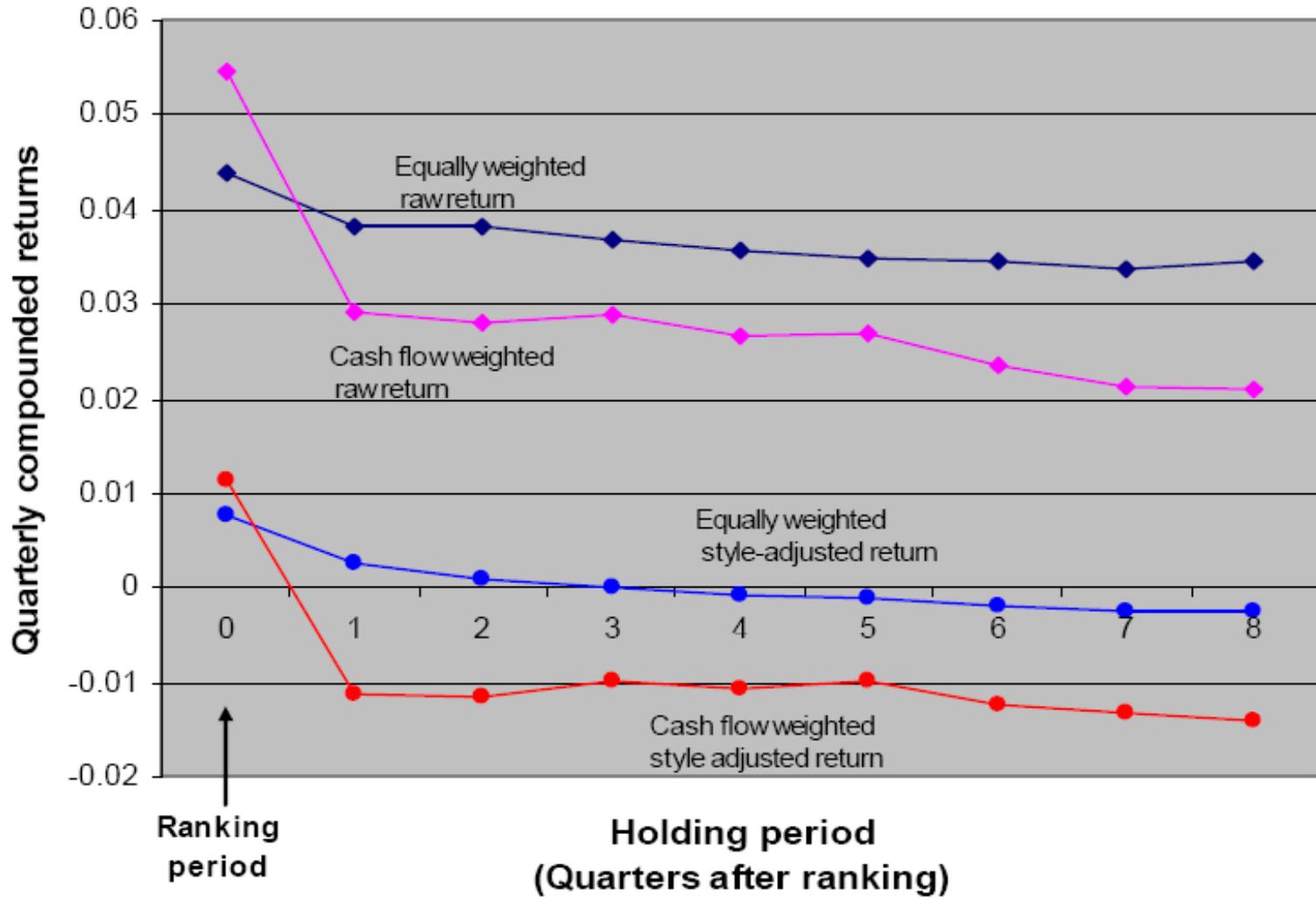
Consider the two “investment portfolios”:

- Investing equally in all hedge funds with *above* median cash flows;
- Investing equally in all hedge funds with *above* median cash flows ( $\approx$  negative cash flows);

And the “divestment portfolios”:

- Investing in all hedge funds with *below* median cash flows, weighted by their cash flows.
- Investing in all hedge funds with *below* median cash flows, weighted.

### Panel A: Investment Portfolio



# The investment portfolios

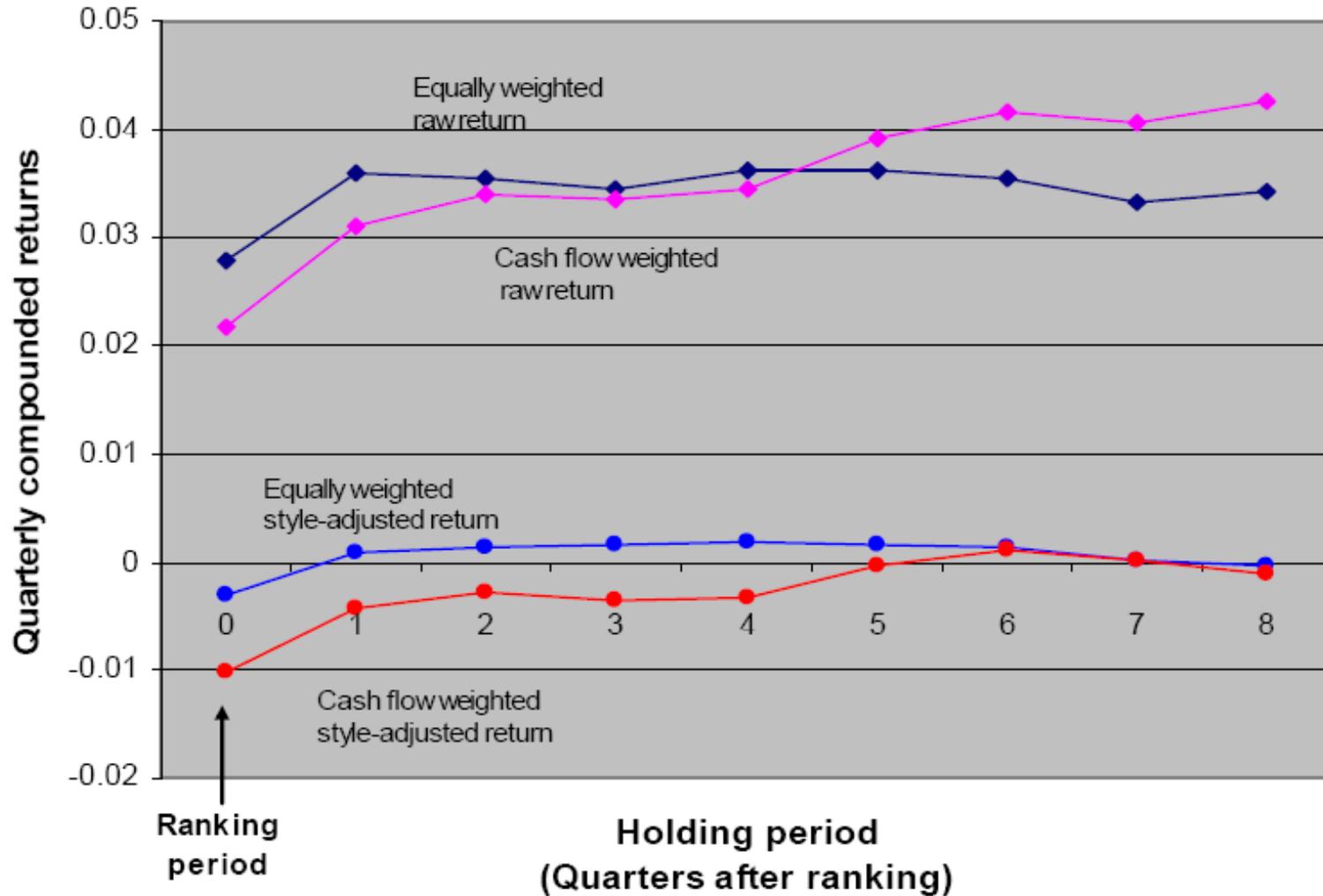
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The cash-flow weighted return, after ranking, is below the equally weighted return.

The cash-flow weighted portfolio underperforms the style index by about 1% per quarter.

- Investors invest more money in funds that do relatively poorly (among the investment set of funds).
- The opportunity cost is substantial, had they equally allocated their money across all funds in the investment set.
- Huge inflows affect future investment opportunities negatively?

## Panel B: Divestment Portfolio



## The divestment portfolios

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The divestment portfolios work pretty well.

In the quarters after ranking there are no significant differences between the actual investors' allocation and the equally weighted portfolio.

Both are not significantly different from zero after adjusting for style.

Comparing the investment and divestment portfolios, the differences are statistically insignificant and at many horizons the investment portfolios underperform (up to -2.16% per quarter). There is no evidence of smart money.

## Summarizing: three main findings

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- Our results do not support the smart-money effect (no significant positive differences in performance between funds with positive and negative money flows).
- Investors are limited in directing their money to the persistent winners. They invest mostly in funds that subsequently perform poorly, underperforming the style index by more than 1% per quarter.
- Conversely, investors are fast and successful in de-allocating from the persistent losers, ensuring a disciplining mechanism for low quality funds.

# Can investors exploit the persistence of the winners?

## 1. Ranking on dollar flows

Panel A: Ranking of funds based upon dollar flows

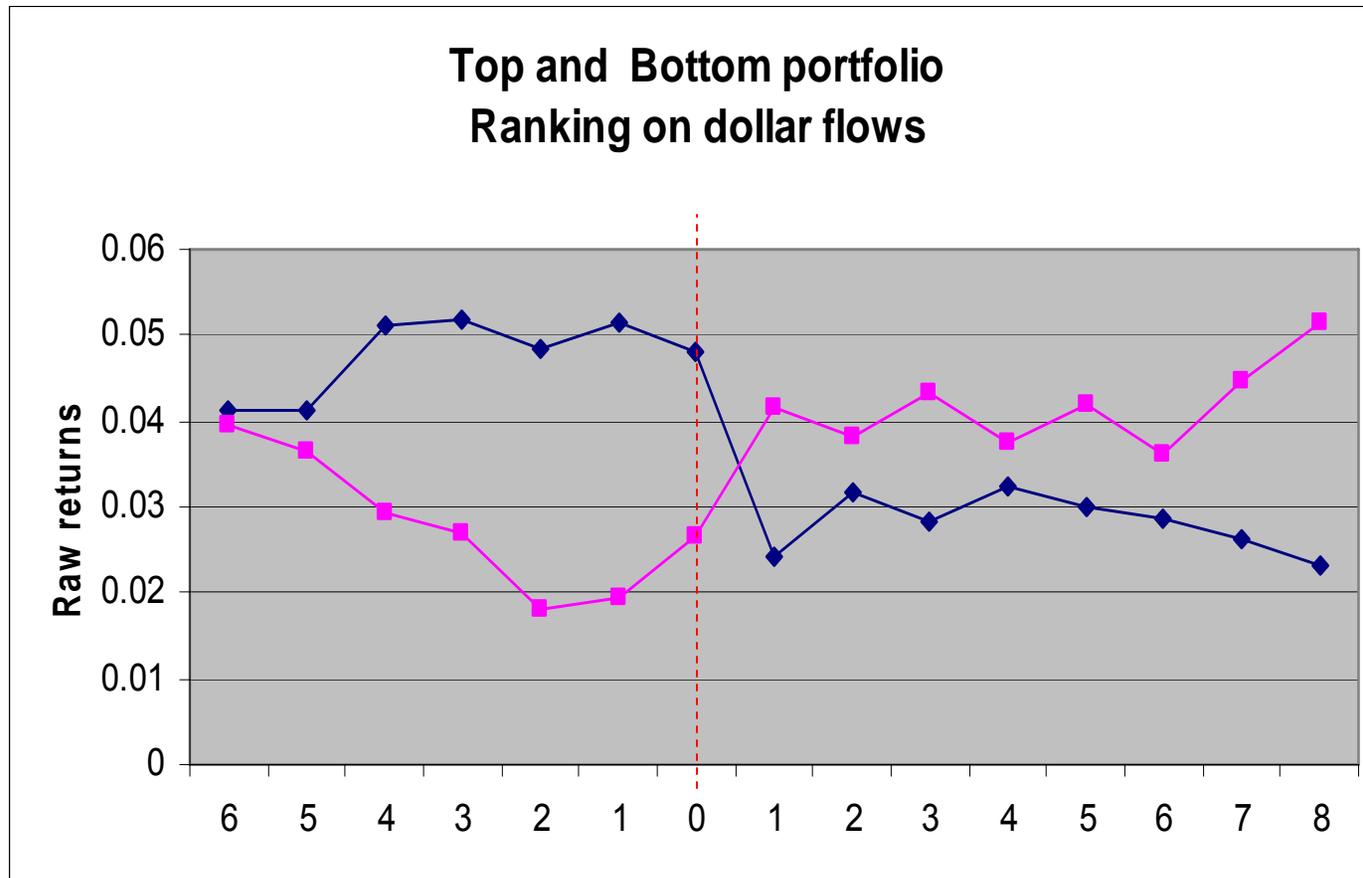
Decile	Average Dollar Flow	Average Size (TNA)	Average StDev of returns	Raw return		Style-adjusted return			
				Ranking Period	Subsequent period	Ranking Period	Subsequent Period		
High 1	31990875	270335775	0.0361	0.0482	0.0244	0.0083	(0.0057)	-0.0129	(0.0037)
2	5220235	64937770	0.0413	0.0548	0.0415	0.0150	(0.0053)	0.0056	(0.0050)
3	1677148	42277500	0.0498	0.0479	0.0483	0.0113	(0.0041)	0.0080	(0.0045)
4	511681	22030993	0.0568	0.0356	0.0372	-0.0010	(0.0059)	0.0043	(0.0053)
5	96343	13827815	0.0636	0.0385	0.0421	0.0067	(0.0068)	0.0117	(0.0061)
6	-62963	13769655	0.0668	0.0146	0.0377	-0.0117	(0.0064)	0.0060	(0.0077)
7	-339940	16451894	0.0645	0.0248	0.0293	-0.0010	(0.0079)	-0.0048	(0.0071)
8	-1166137	28250860	0.0565	0.0349	0.0385	0.0034	(0.0060)	0.0006	(0.0053)
9	-3783236	64065157	0.0473	0.0331	0.0311	-0.0008	(0.0047)	-0.0045	(0.0060)
Low 10	-31575580	303904259	0.0426	0.0265	0.0411	-0.0070	(0.0046)	0.0022	(0.0055)
High-Low	63566455	-33568484	-0.0065 (0.0018)	0.0217 (0.0077)	-0.0166 (0.0074)	0.0153	(0.0063)	-0.0152	(0.0062)

## Deciles based on dollar flows

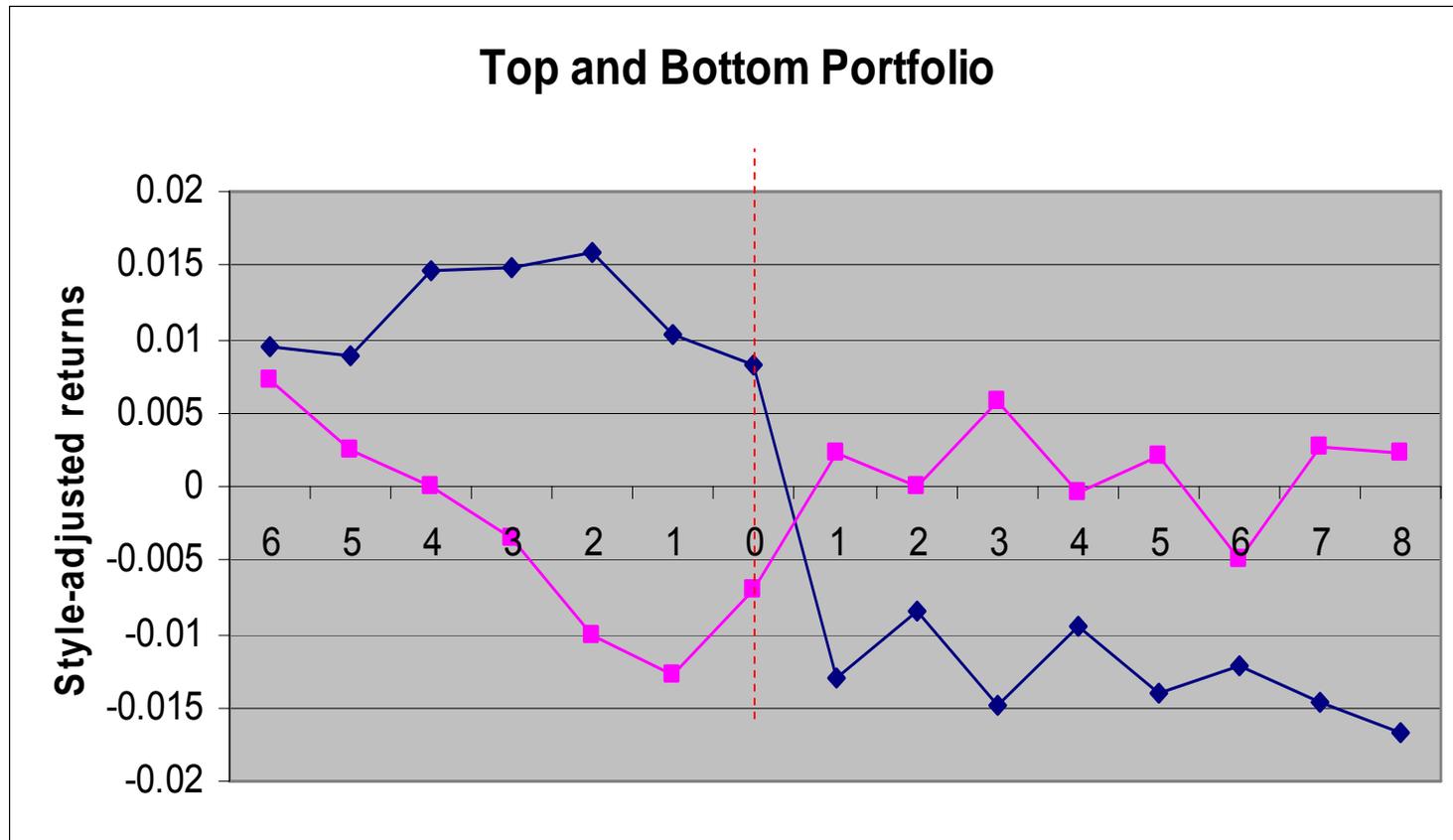
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- In the ranking period, most of investors' money is not directed towards the very best.
- In the first quarter after ranking, returns of the top decile fall to 2.44%, significantly underperforming the style index.
- Note that these are large and relatively old funds.
- The bottom decile portfolio also contains large and fairly old funds. Its performance after ranking is average.
- Note that large funds experience either large positive cash flows or large negative flows (cf. the switching regression model).

# The performance of the top and bottom portfolios



# The performance of the top and bottom portfolios



# Can investors exploit the persistence of the winners?

## 2. Ranking on growth rates

Panel B: Ranking of funds based upon growth rates

Decile	Average Growth Rate	Average Size( TNA)	Average StDev of returns	Raw return		Style-adjusted return			
				Ranking period	Subsequent period	Ranking period	Subsequent period	Ranking period	Subsequent period
High 1	0.5869	39470274	0.0488	0.0651	0.0389	0.0263	(0.0079)	0.0023	(0.0058)
2	0.1454	74105656	0.0480	0.0459	0.0369	0.0101	(0.0046)	0.0004	(0.0044)
3	0.0707	102757397	0.0468	0.0425	0.0354	0.0047	(0.0054)	-0.0013	(0.0043)
4	0.0296	127072190	0.0469	0.0331	0.0392	-0.0017	(0.0058)	0.0010	(0.0069)
5	0.0078	91574826	0.0582	0.0325	0.0413	-0.0009	(0.0047)	0.0097	(0.0054)
6	-0.0067	69821320	0.0587	0.0188	0.0385	-0.0122	(0.0056)	0.0031	(0.0060)
7	-0.0262	93245734	0.0583	0.0204	0.0347	-0.0092	(0.0066)	-0.0002	(0.0069)
8	-0.0588	88237750	0.0561	0.0242	0.0331	-0.0053	(0.0068)	-0.0028	(0.0057)
9	-0.1259	99617725	0.0513	0.0310	0.0372	-0.0008	(0.0059)	0.0014	(0.0060)
Low 10	-0.3557	51232233	0.0526	0.0457	0.0358	0.0121	(0.0076)	0.0025	(0.0066)
High-Low	0.9426	-11761959	-0.0038	0.0194	0.0031	0.0142	(0.0106)	-0.0001	(0.0060)
			(0.0022)	(0.0120)	(0.0067)				

## Deciles based on growth rates

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- In this case, the extreme deciles contain the smaller funds; the middle deciles containing the larger funds.
- The top decile has very high returns in the ranking period (6.5%), but reduces to the overall average subsequently.
- In general, these results indicate that hedge fund investors are unable to chase the winners at short horizons.

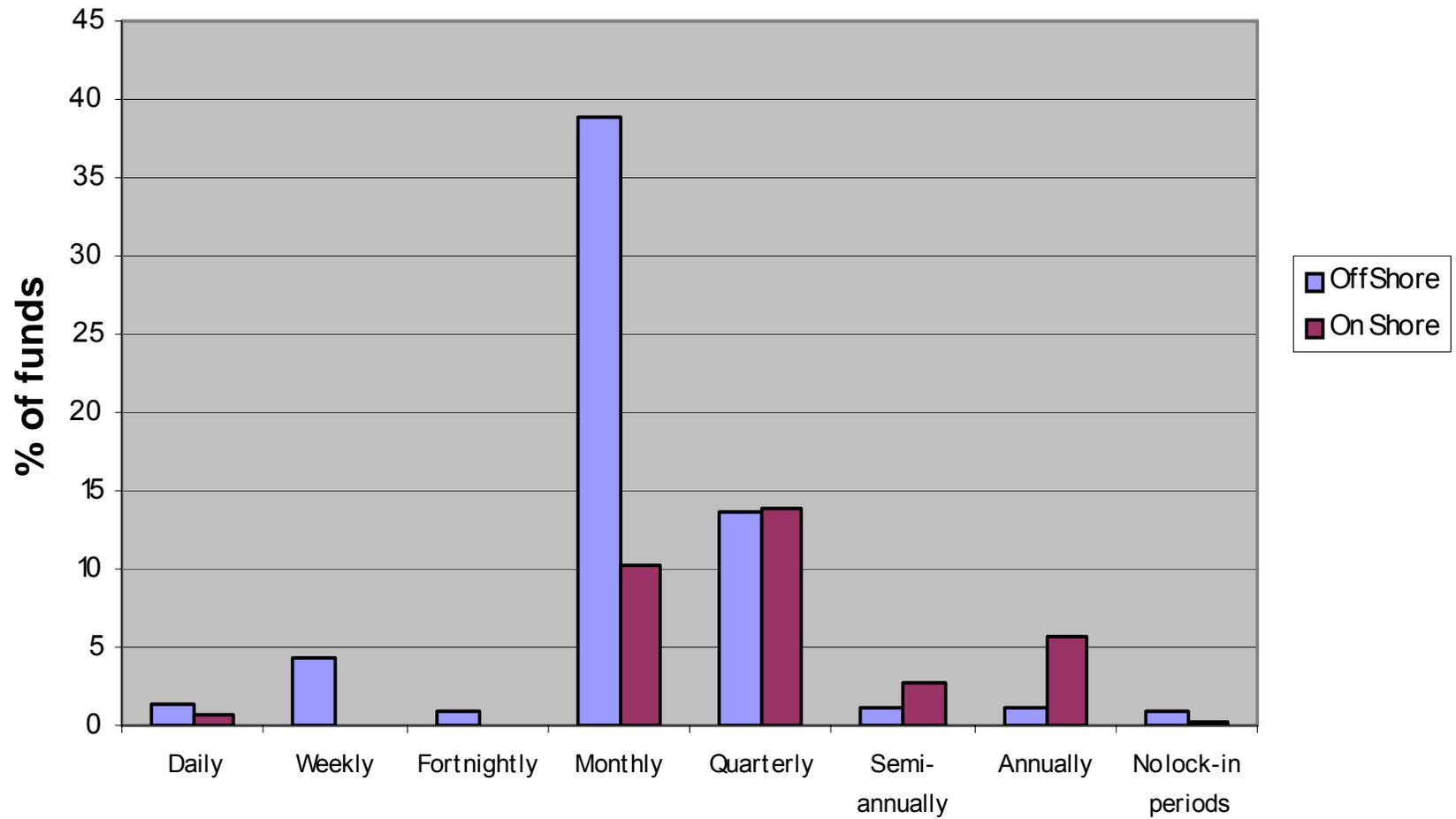
# General conclusions

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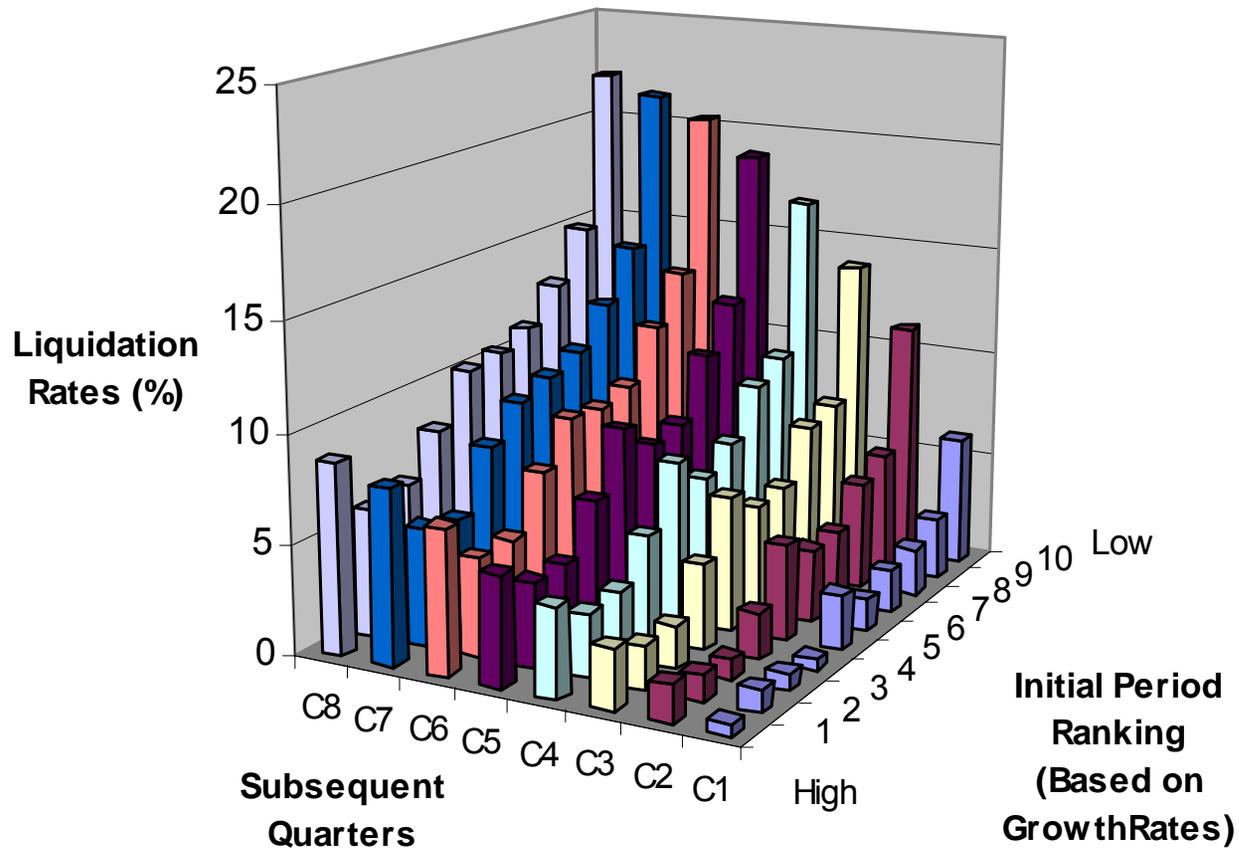
- We find a **linear** flow-performance relation in quarterly horizons and significant **asymmetries** between the decisions to invest and divest of hedge fund investors.
- Hedge fund investors react fast to bad performance (as a result of active monitoring of funds). As a consequence, they are able to exploit the persistence of the losers. Furthermore, outflows are a very effective punishing mechanism for bad performance.
- Hedge fund investors react slowly to recent good performance (as a result of searching costs and liquidity restrictions). As a consequence, they are unable to exploit the persistence of the winners. There is **no evidence of smart money**.



# Hedge funds Redemption Frequencies

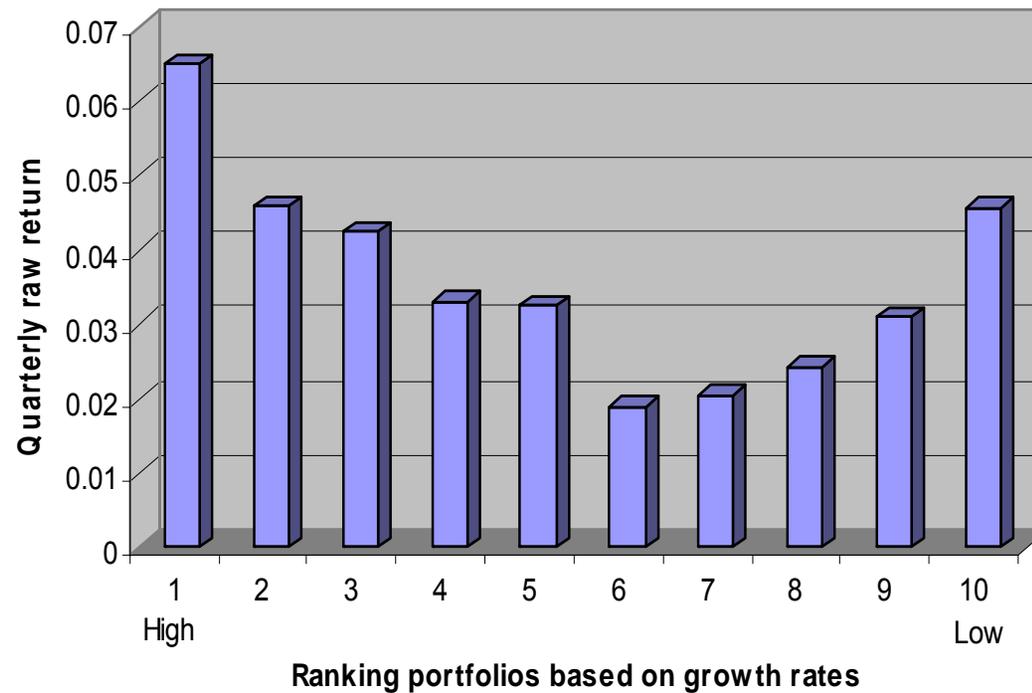


# Liquidation rates and money flows



# The contemporaneous relation between raw returns and ranks based on growth rates

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# Flow-Performance Relationship for Hedge Funds (Decile 10 : Best performers)

