

Holding Horizon: A New Measure of Active Investment Management

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Motivation

- Anecdotal evidence of success of some long-term investors
 - Warren Buffett: “favorite holding period is forever”.
 - Mario Gabelli: Five-star Gabelli Small Cap Growth fund holds stocks on average for five and half years.
- Theoretically, in Wang’s (1993) model, heterogenously-informed investors have very different trading strategies: less-informed investors exhibit higher level of short-term trading (turnover), whereas better-informed investors have more stable positions.
- However, empirical evidence mainly focuses on short-term investing strategies and performance, and scant evidence of skill among long horizon funds.
- We propose new holdings-based measures of fund investment horizon to identify short vs. long horizon funds and study their performance.

Long-term information

- Fundamental analysis of a firm's long-run cash flows: Managers generate insights about the future prospects of the firm's major projects and market competitive position, as well as the strength of the firm's balance sheet.
- Stocks are likely to perform well in the long run, but perhaps not short-run

Short-term information

- Time-varying investor sentiment and momentum anomaly
- Stocks are likely to have good short-term returns, but perhaps not long-run

To test our conjecture

- Propose novel holdings-based measures of fund investment horizon
- Funds in the top tercile (quintile or decile) are defined as long-horizon funds, and those in the bottom tercile (quintile or decile) are defined as short-horizon funds
- Two approaches to study the relation between fund investment horizon and manager skills
 - **Fund-level** analysis: Directly examines the relation between fund holding horizon and future fund performance over 1 month and up to 5 years.
 - **Stock-level** analysis: Aggregates consensus opinions of the value of a stock from long- and short-horizon funds separately, and investigates future stock performance over 1 month and up to 5 years.

Main results I

- Wide cross-sectional dispersion in style-adjusted fund investment horizon: funds in the shortest, middle, and longest horizon quintiles, on average, hold stocks for 2.02, 3.49, and 7.39 years.
- Long-horizon funds relative to short-horizon funds:
 - Are larger, older, and cheaper
 - Tend to attract more long-term investors

Fund-level evidence

- In the sorted portfolio analysis
 - Long-horizon funds exhibit higher long-term risk-adjusted performance than short-horizon funds.
 - Short-horizon funds earn negative Carhart (1997) four-factor net return alphas in the short run.
- In multivariate Fama-MacBeth regressions
 - A positive fund horizon-performance relation after controlling for fund characteristics and other measures of active management

Stock-level evidence

- Stocks largely held by long-horizon funds outperform stocks largely held by short-horizon funds by roughly 2.7%–3.5% per year over the following five years.
- Economic source of manager skills:
Long-horizon funds are able to select stocks with better fundamentals (e.g., earnings and cash flow news)

Comparison with turnover

- Being a simple summary statistic about trading activity, (the inverse of) turnover has downward bias as a proxy of fund holding horizon.
- Using our measures, we identify significant cross-sectional differences in fund manager skills, as opposed to the time-series variations within a fund that are identified by Pástor et al. (2017) using fund turnover.

Related literature

Large literature that uses holdings information to study mutual fund performance:

- Grinblatt and Titman (1989), (1993), Daniel et al. (1997), Wermers (2000), Chen et al. (2000), Cohen et al. (2005), Kacperczyk and Seru (2007), Kacperczyk et al. (2005, 2008), Alexander et al. (2007), Cremers and Petajisto (2009), and Baker et al. (2010)
- Our paper adds a novel dimension—the holdings-based measurement of a fund's investment horizon

The existing mutual fund literature has investigated the fund turnover-performance relation and provides conflicting evidence:

- Carhart (1997): A cross-sectional, negative relation based on fund net returns
- Grinblatt and Titman (1993), Chen et al. (2000) and Wermers (2000): Funds that trade more frequently have better stock selection skills than funds that trade less often.
- Pástor et al. (2017): Time-series changes in turnover at a given fund positively forecasts that fund's future performance.

Related literature (cont'd)

- Classification of short-term vs. long-term investors using 13-F data relevant when:
 - Investigating the effect of shareholders composition on corporate decisions (e.g., Bushee, 2001, Gaspar, Massa, and Matos 2005)
 - The trading behavior of institutional investors and their effect on stock prices: Yan and Zhang (2007) document that short-term institutions are better informed than long-term institutions.
- Mutual funds are included in the 13-F data but only at the family level:
 - Heterogeneity in the investment horizon that is present at the fund level is lost at the family level.
 - Active funds are aggregated together with passive funds.
- Little work on mutual fund performance over the long-run (one exception is Frazzini and Lamont, 2008, although the focus is on stock returns)

Measuring fund investment horizon I

- Fund investment horizon is defined as value-weighted average of the holding periods of stocks in a fund portfolio.
- Differ in the definition of the holding horizon of stock i held in fund j at time t :

Simple horizon measure: the length of time from the initiation of a position to the time that the stock is fully liquidated by a fund.

$$h_{i,j,t}^{(1)} = s - k, \text{ for } k \leq t < s,$$

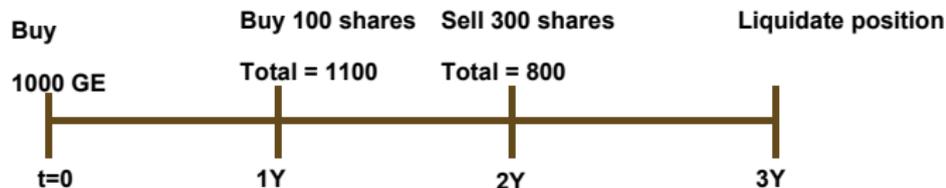
where the stock is purchased at time k and sold at time s .

- The **Ex-Ante Simple measure:** Let θ_j be the date that is five years after the initiation date of fund j .

$$h_{i,j,t}^{(2)} = t - k, \text{ for } k \leq t \text{ and } t > \theta_j$$

- We also tried more complicated measures accounting of the inventory (e.g., FIFO measure and duration measure of Cremers and Pareek 2011)

Example for computing the Simple and Ex-Ante measures



Simple horizon measure:

at $t=0$, 1Y, and 2Y: 3 years

Ex-Ante measure (only use information until the current period t):

at $t=0$: 0 year

at $t=1Y$: 1 year

at $t=2Y$: 2 years

Accounting for funds' investment styles

- Funds with different investment objectives and styles typically focus on different pools of stocks.
- Use a style-adjusted fund investment horizon—a fund's investment horizon in excess of the average investment horizon of all funds with the same investment style as that fund.
- Nine fund style categories (Hunter et al., 2014): large-capitalization (with benchmark Russell 1000 Value, Russell 1000, or Russell 1000 Growth), mid-capitalization (with benchmark Russell Midcap Value, Russell Midcap, or Russell Midcap Growth), or small-capitalization funds (with benchmark Russell 2000 Value, Russell 2000, or Russell 2000 Growth)
- Each month all funds are sorted into rank portfolios based on their style-adjusted fund investment horizon
- Funds in the top portfolio are defined as long-horizon funds, and those in the bottom are classified as short-horizon funds.

- U.S. active equity mutual funds come from the intersection of Thomson Reuters mutual fund holdings database and CRSP mutual fund database using MFLINKS.
- Follow Kacperczyk, Sialm, and Zheng (2008) for fund sample selection.
- We exclude index funds and funds with less than 2 years of holdings data.
- Stock returns, prices, and shares outstanding are obtained from the CRSP; Accounting data come from Compustat and analysts forecasts come from IBES.
- The final sample includes 2969 equity funds.

Summary statistics: Sorting on the style-adjusted Ex-Ante Simple measure

	Q1 (short)	Q2	Q3	Q4	Q5 (long)	Q5-Q1
TNA (millions)	785.26	875.99	1166.22	1468.57	2402.16	1616.91***
Expense ratio (%)	1.32	1.29	1.26	1.18	1.05	-0.27***
Fund age (years)	19.88	19.34	19.37	20.51	24.67	4.79***
Simple measure (years)	2.02	2.71	3.49	4.74	7.39	5.37***
Ex-Ante Simple measure (years)	1.01	1.47	1.96	2.71	4.47	3.46***
Style-adjusted Ex-Ante Simple measure (years)	-1.43	-0.78	-0.27	0.42	2.09	3.52***
CRSP fund turnover (%)	146.76	108.03	79.75	55.34	31.22	-115.54***
Cash allocation (%)	5.58	5.89	5.83	6.52	6.03	0.45
Size rank	4.11	3.99	4.00	4.06	4.22	0.11***
Book-to-market rank	2.74	2.66	2.64	2.67	2.73	-0.01**
Momentum rank	3.35	3.36	3.28	3.15	3.03	-0.31***
Amihud measure rank	1.19	1.24	1.25	1.25	1.23	0.04***
Proportion of TNA in class A	0.50	0.45	0.53	0.58	0.60	0.10***

Long-horizon funds relative to short-horizon funds:

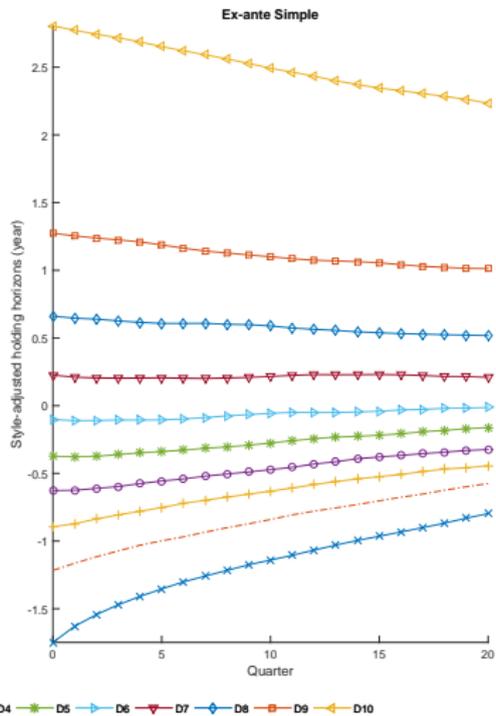
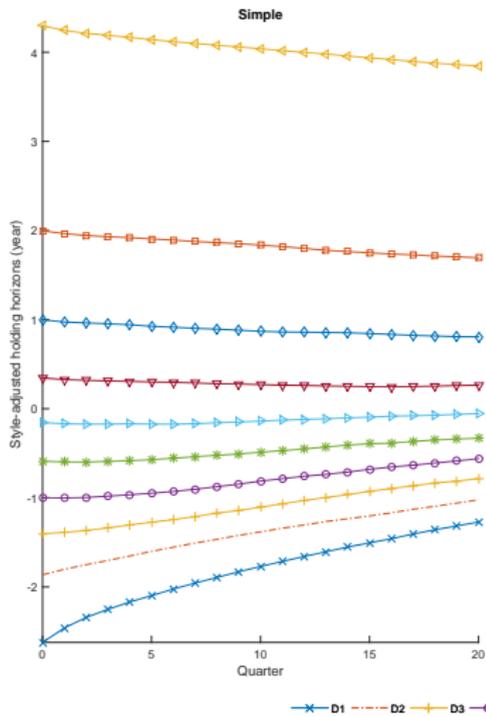
- Larger and older funds with a lower expense ratio and turnover ratio
- Invest more in larger stocks and past losers.
- Cater to long-term investors: More assets in share class A, consistent with the clientele of long-horizon funds being more patient

Correlations of fund horizon measures and fund turnover

	Simple	Ex-Ante Simple	1/CRSP TR	1/Holdings TR
Simple	1.00	0.89	0.37	0.30
Ex-ante simple	0.89	1.00	0.39	0.33
1/CRSP TR	0.37	0.39	1.00	0.37
1/Holdings TR	0.30	0.33	0.37	1.00

- A high correlation among our measures (0.89)
- The correlations between our horizon measures and the inverse of turnover are much smaller, less than 0.4.

Persistence of the horizon measures



- Buy-and-hold portfolio abnormal returns to measure stock selection skills
 - The difference of buy-and-hold portfolio returns between the portfolio of interest and the characteristic-based benchmark of Daniel, Grinblatt, Titman, and Wermers (DGTW, 1997)
 - The four-factor alpha of Carhart's (1997)
- Fund-level analysis: Use both sorted fund portfolio approach and Fama-MacBeth cross-sectional regressions that control for fund characteristics
- Stock-level analysis: Use sorted stock portfolio approach

Fund-level analysis—sorting funds (Ex-Ante Simple)

	Value-weighted			Equally-weighted		
	Net ret	Net 4-F α	DGTW	Net ret	Net 4-F α	DGTW
1-month						
D1 (short)	0.84	-0.07	0.01	0.81	-0.11**	0.01
D10 (long)	0.95	0.08*	0.09**	0.87	0.00	0.05*
D10-D1	0.11*	0.15***	0.09*	0.06	0.11**	0.04
1-year						
D1 (short)	10.88	-0.28	0.48	10.45	-0.44	0.04
D10 (long)	11.71	0.79*	1.15**	10.89	0.37	0.67
D10-D1	0.83	1.06*	0.67	0.44	0.80	0.63
2-year						
D1 (short)	21.75	-0.16	0.64	20.61	-0.98	-0.09
D10 (long)	24.06	2.24***	2.70**	21.93	1.04	1.39
D10-D1	2.31**	2.41**	2.05**	1.32	2.02*	1.51**
3-year						
D1 (short)	33.64	-0.20	1.72	31.79	-2.11*	-0.20
D10 (long)	37.60	4.27***	4.99**	33.99	1.80	2.55*
D10-D1	3.95**	4.47**	3.27**	2.20	3.91***	2.83***
4-year						
D1 (short)	47.07	-0.37	1.75	41.41	-3.53***	-1.02
D10 (long)	53.58	6.22***	7.18***	45.30	3.21*	4.06*
D10-D1	6.51***	6.59***	5.43***	3.88	6.74***	5.16***
5-year						
D1 (short)	62.06	-1.27	2.79	55.11	-5.20***	-0.50
D10 (long)	70.05	8.57***	9.79**	60.12	4.78*	7.06**
D10-D1	8.00***	9.84***	7.00***	5.01	9.98***	7.57***

- Long-horizon funds earn a significantly positive 4-F net return alpha and DGTW-adjusted returns.
- Short-horizon funds earn a negative 4-F net return alpha in the short run.
- Long-horizon funds outperform short-horizon funds.

Fama-MacBeth regressions: 4-F net return alphas

	1M	1Y	3Y	5Y	1M	1Y	3Y	5Y	1M	1Y	3Y	5Y
Ex-Ante Simple ($HH^{(2)}$)	0.01 (0.03)	0.23 (0.01)	0.93 (0.00)	1.68 (0.00)	0.01 (0.06)	0.21 (0.01)	0.85 (0.00)	1.57 (0.00)	0.01 (0.05)	0.20 (0.03)	0.71 (0.00)	1.33 (0.00)
Fund size	0.01 (0.10)	0.09 (0.08)	0.30 (0.09)	-0.00 (1.00)	-0.00 (0.35)	0.01 (0.88)	0.33 (0.03)	0.35 (0.39)	0.01 (0.23)	0.07 (0.21)	0.34 (0.07)	0.22 (0.56)
Expense	-0.10 (0.00)	-0.93 (0.00)	-2.12 (0.00)	-3.51 (0.00)	-0.09 (0.00)	-0.83 (0.00)	-2.38 (0.00)	-4.60 (0.00)	-0.10 (0.00)	-0.96 (0.00)	-2.14 (0.00)	-3.78 (0.00)
Age	-0.00 (0.81)	-0.44 (0.00)	-2.20 (0.00)	-3.64 (0.00)	-0.00 (0.83)	-0.35 (0.02)	-1.55 (0.00)	-2.64 (0.00)	-0.01 (0.15)	-0.45 (0.00)	-1.93 (0.00)	-3.35 (0.00)
Flow volatility	0.34 (0.03)	3.25 (0.10)	10.58 (0.08)	25.45 (0.05)	0.00 (0.99)	-0.42 (0.85)	-2.33 (0.65)	1.90 (0.78)	0.30 (0.03)	1.48 (0.43)	2.87 (0.60)	10.17 (0.21)
Fund flow	0.01 (0.01)	0.00 (0.96)	0.02 (0.95)	0.27 (0.70)	0.01 (0.01)	0.02 (0.58)	0.11 (0.55)	0.08 (0.78)	0.01 (0.01)	0.02 (0.61)	0.00 (1.00)	0.01 (0.97)
CRSP TR	0.00 (0.85)	0.30 (0.18)	0.78 (0.18)	0.56 (0.44)	0.01 (0.55)	0.42 (0.10)	0.74 (0.23)	0.47 (0.62)	0.00 (0.71)	0.22 (0.22)	0.42 (0.31)	-0.05 (0.94)
Active Share					0.12 (0.30)	2.43 (0.06)	14.25 (0.00)	32.26 (0.00)				
R2									-0.19 (0.16)	-2.39 (0.18)	-13.89 (0.02)	-28.07 (0.01)

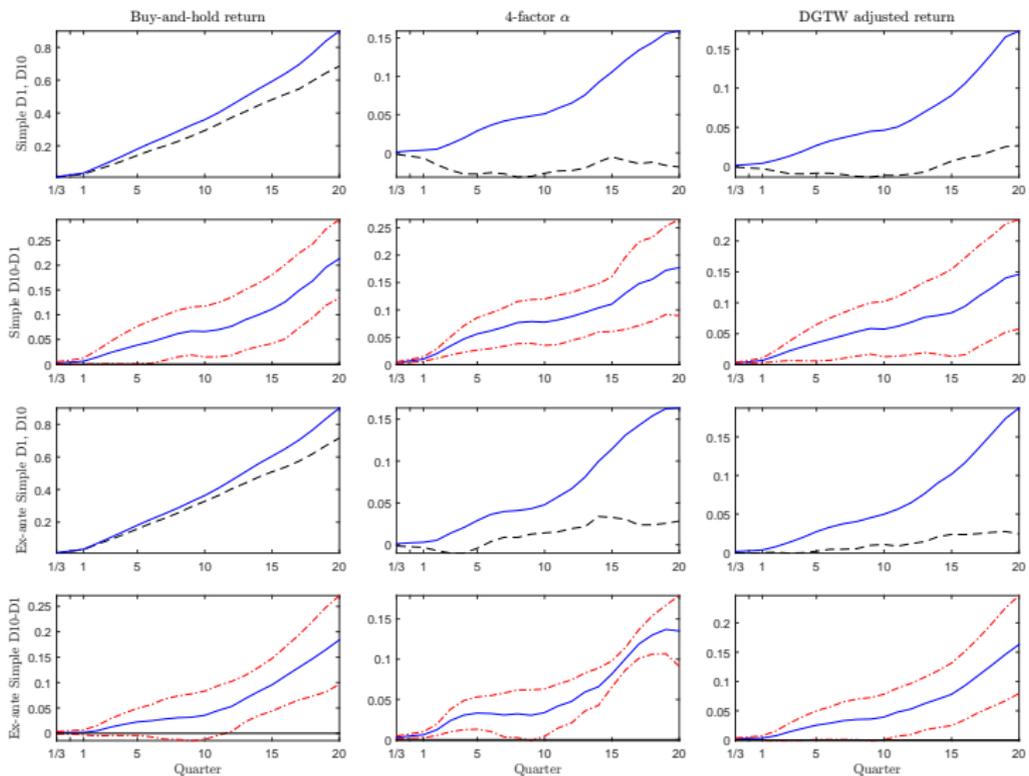
- Fund investment horizon positively predicts future fund alphas.
- Controlling for fund characteristics, a 2-STD increase in the Ex-Ante Simple measure raises fund 4-F alpha by about 4.64% over a five-year period.
- Fund age and expense ratio negatively affect future fund performance
- The predictive power of Ex-Ante Simple measure remains similar after controlling for turnover ratio (CRSP TR), Active Share, R2, and return gap.

Measures of aggregate consensus opinions of stock value:

- Long-horizon (top tercile HH) fund holdings (*LFH*) vs. short-horizon (bottom tercile HH) fund holdings (*SFH*):
 - *LFH* (*SFH*) is the aggregate stock holdings by long- (short-) horizon funds divided by the total number of shares outstanding.

Examine future performance of stocks that are sorted into quintiles based on the difference between *LFH* and *SFH*

Informativeness of fund holdings I: Sorting on $LFH - SFH$



Informativeness of fund holdings II: Sorting on $LFH - SFH$

	Simple ($HH^{(1)}$)			Ex-Ante Simple ($HH^{(2)}$)		
	Ret	4-F α	DGTW	Ret	4-F α	DGTW
1-month						
D1 (short)	0.94	-0.17	-0.07	0.98	-0.15	-0.05
D10 (long)	1.14	0.13	0.15	1.13	0.12	0.15
D10-D1	0.20 (0.27)	0.29 (0.03)	0.22 (0.03)	0.15 (0.28)	0.27 (0.03)	0.20 (0.04)
1-year						
D1 (short)	11.07	-2.74	-0.94	12.50	-1.00	-0.01
D10 (long)	14.17	1.95	1.96	14.28	2.06	1.98
D10-D1	3.10 (0.10)	4.69 (0.00)	2.90 (0.04)	1.77 (0.18)	3.05 (0.01)	1.99 (0.11)
2-year						
D1 (short)	22.66	-3.15	-1.25	25.57	0.87	0.52
D10 (long)	28.83	4.53	4.08	28.65	4.08	4.04
D10-D1	6.18 (0.03)	7.69 (0.00)	5.34 (0.03)	3.08 (0.24)	3.21 (0.08)	3.52 (0.10)
3-year						
D1 (short)	37.24	-2.30	-0.95	40.41	1.93	1.17
D10 (long)	44.90	6.49	5.91	45.71	6.68	6.47
D10-D1	7.67 (0.03)	8.79 (0.00)	6.86 (0.03)	5.30 (0.08)	4.75 (0.00)	5.29 (0.05)
4-year						
D1 (short)	51.44	-0.98	1.16	53.81	3.05	2.34
D10 (long)	64.09	12.07	10.60	65.11	13.09	11.66
D10-D1	12.65 (0.01)	13.04 (0.00)	9.44 (0.05)	11.30 (0.00)	10.04 (0.00)	9.31 (0.01)
5-year						
D1 (short)	68.56	-1.83	2.66	71.63	2.83	2.43
D10 (long)	89.89	15.90	17.27	90.03	16.34	18.74
D10-D1	21.33 (0.00)	17.73 (0.00)	14.62 (0.01)	18.40 (0.00)	13.51 (0.00)	16.31 (0.00)

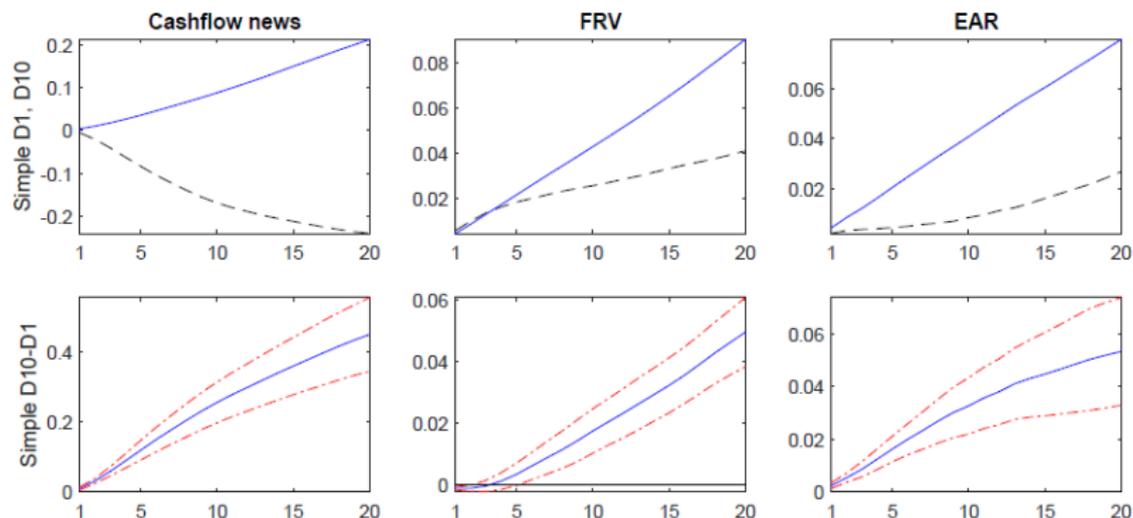
Sources of superior performance

Examine whether fund managers have superior information about the fundamentals of a company:

- Cash-flow news (CFnews): the CF component of unexpected quarterly returns
- Analyst forecast revision (FRV): the consensus EPS forecast for the current fiscal year, minus the consensus EPS forecast for the same fiscal year formed 3 months ago, then divided by stock prices 3 months ago
- Earnings-announcement-window returns (EAR): the buy-and-hold return during the $[-1, +1]$ trading-day-window around an earnings announcement date

Sort funds into quintiles according to LFH minus SFH , compute quarterly cash-flow information of the stocks in the different quintiles, then cumulate these quarterly CF variables over n quarters ($1 \leq n \leq 20$).

Sources of superior performance: Results



- The pattern of portfolio performance in terms of cash flows for stock quintile portfolios is analogous to the performance pattern of returns for these portfolios.

Comparison with turnover

Compared with turnover, our fund horizon measures more richly capture fund holding horizons, especially at long horizons, when dispersion in a fund's stock holding periods is large.

In a theoretical circumstance without investor flow:

- When all stocks are held for the same periods of time in a fund portfolio, the (inverse of) turnover ratio is equivalent to fund holding horizon.
- When holding periods of securities are different, as the case for all actively managed funds, Jensen's inequality makes (the inverse of) turnover underestimate the true weighted-average holding period, though turnover can reflect short-term trading activities well.

Turnover is defined based on trades in a rolling window, such as the past-year window, that can further exacerbate the underestimation bias and create large changes across years.

Fund investment horizon vs. CRSP turnover: Predicting future alphas

- Run panel regressions of future fund abnormal returns on current fund investment horizon and turnover, while controlling for fund characteristics.
- Panel regressions differ in their inclusion of (1) no fixed effects, (2) fund fixed effects, and (3) time fixed effects.
- With no fixed effects, or with time fixed effects, fund investment horizon positively predicts future fund performance, while fund turnover is insignificant
- Once we add a fund fixed effect to panel regressions, turnover becomes a significant indicator of future fund performance over periods of less than a year (Pástor et al., 2017)

Fund investment horizon vs. CRSP turnover: Predicting future alphas (results)

Panel A: Dependent variable—four-factor alphas			
	No fixed effects	Fund fixed effects	Time fixed effects
1 month			
Ex ante simple	0.013 (0.16)	-0.019 (0.20)	0.013 (0.16)
CRSP turnover	-0.005 (0.75)	0.035 (0.08)	-0.000 (0.99)
1 year			
Ex ante simple	0.150 (0.03)	-0.116 (0.28)	0.172 (0.01)
CRSP turnover	0.180 (0.14)	0.190 (0.21)	0.211 (0.08)
3 years			
Ex ante simple	0.776 (0.00)	-0.118 (0.66)	0.839 (0.00)
CRSP turnover	0.333 (0.27)	0.262 (0.46)	0.435 (0.15)
5 years			
Ex ante simple	1.602 (0.00)	-0.075 (0.86)	1.725 (0.00)
CRSP turnover	0.106 (0.87)	-0.210 (0.77)	0.270 (0.68)

Explaining performance of short vs long-horizon funds

- Short-horizon funds underperform because they are over-allocated (as in Chen 2019) and receive higher and more volatile flows.
 - They receive more flows because investors chase high factor-related returns (FRR as in Song 2020)
 - Also they tend to be sold more through a broker (especially unaffiliated)
- Long-horizon funds are able to maintain outperformance because they are under-allocated and receive lower and more stable flows by catering to long-term investors
 - Outperformance is concentrated among low FRR funds
 - Lower flow sensitivity to past performance

More stats on short vs long-horizon funds

	Q1 (short)	Q2	Q3	Q4	Q5 (long)	Q5-Q1
Factor-Related Return (%)	0.42	0.27	0.04	-0.11	0.01	-0.41***
Quarterly flows (%)	2.72	1.08	1.29	0.33	0.11	-2.61*
Volatility flows	0.04	0.04	0.04	0.03	0.03	-0.01***
Prop. of TNA with front load (%)	49.40	48.68	54.53	53.85	61.64	12.24***
Prop. of TNA with rear load (%)	29.14	28.03	30.09	31.91	32.66	3.52***
Funds broker sold (%)	51.98	54.99	55.25	52.33	47.63	-4.35***
Funds with captive brokers	9.85	12.49	13.28	12.43	10.73	0.88
Funds with unaffiliated brokers	41.81	42.40	41.83	39.73	36.78	-5.04***
Family TNA	22155.42	19140.80	21177.33	26347.01	36063.55	13908.13***
real - efficient size (median)	-1.05	-0.29	-0.47	-1.26	-14.16	-13.12***
Funds with positive real-efficient (%)	57.02	54.88	56.22	53.91	43.08	-13.93***

Fund performance conditional on low and high FRR

	High FRR			Low FRR		
	Net ret	Net 4-F α	DGTW	Net ret	Net 4-F α	DGTW
1-month						
Q1 (short)	0.86	-0.10	0.05	0.93	0.03	0.04
Q5 (long)	0.92	0.02	0.05	1.01	0.15**	0.12**
Q5-Q1	0.06	0.11**	-0.00	0.08*	0.12***	0.08
1-year						
Q1 (short)	10.90	-0.48	0.42	11.45	0.82	0.37
Q5 (long)	11.38	0.01	0.61	12.43	2.14**	1.57**
Q5-Q1	0.48	0.49	0.19	0.98*	1.32**	1.20**
2-year						
Q1 (short)	22.01	-0.47	0.81	23.10	2.10	1.30
Q5 (long)	22.69	-0.57	1.23	25.11	4.34***	3.54**
Q5-Q1	0.68	-0.10	0.42	2.01**	2.24**	2.25***
3-year						
Q1 (short)	33.56	-1.04	1.69	36.00	2.96**	2.22
Q5 (long)	35.19	0.27	2.18	38.93	6.58***	6.06**
Q5-Q1	1.63	1.31	0.49	2.94**	3.61**	3.85***
4-year						
Q1 (short)	47.18	-1.33	1.85	50.55	3.77**	2.71
Q5 (long)	49.95	1.05	3.61*	54.99	8.91***	8.23**
Q5-Q1	2.77	2.38**	1.76	4.45**	5.14*	5.52**
5-year						
Q1 (short)	62.41	-0.55	2.81	66.19	2.22	3.45
Q5 (long)	66.01	3.71*	5.96**	71.81	10.57***	11.07**
Q5-Q1	3.59	4.26***	3.15*	5.62*	8.35**	7.62**

Robustness checks

- Is superior performance of long-horizon funds really driven by their long-term holdings?
 - Separate stocks held or traded by long-horizon funds in two groups (above and below median horizon): Better performance among longer-term holdings
- Concern that the long-term portfolio could capture a liquidity or reversal premium instead of investment skill
 - Results are similar when including the liquidity factor of Pástor and Stambaugh (2003) or the long-term reversal factor of De Bondt and Thaler (1985).
- Larger survivorship bias for short-term funds than long-term funds: Work against finding an outperformance of long-term funds over short-term funds.
- If we use turnover ratio to classify funds we find results more similar to Yan and Zhang (2009)
- Horizon measure robust to the Active Share critique by Frazzini et al. (2015)

Comparison with Cremers and Pareek (2016): Predicting 5-year alphas

	RIG	RIV	R2	R2G	R2V	RMG	RMV	S4	S5	S5G
Ex-Ante Simple ($HH^{(2)}$)	1.40 (0.00)	0.87 (0.00)	3.08 (0.00)	1.12 (0.01)	0.84 (0.06)	2.11 (0.00)	0.20 (0.72)	6.27 (0.00)	1.38 (0.00)	1.84 (0.00)
Fund size	0.41 (0.01)	-0.80 (0.00)	0.85 (0.00)	-0.46 (0.11)	1.31 (0.00)	-0.87 (0.01)	1.15 (0.00)	0.24 (0.35)	0.02 (0.78)	1.34 (0.00)
Expense	-0.35 (0.44)	-2.92 (0.00)	-1.18 (0.03)	-7.71 (0.00)	-0.60 (0.39)	-6.96 (0.00)	-2.18 (0.13)	-3.83 (0.00)	-5.63 (0.00)	-5.31 (0.00)
Age	-3.58 (0.00)	1.70 (0.00)	1.63 (0.00)	1.95 (0.01)	-1.31 (0.20)	-5.20 (0.00)	-0.52 (0.62)	-9.79 (0.00)	-2.04 (0.00)	-5.73 (0.00)
Flow volatility	-5.83 (0.25)	-6.93 (0.06)	44.31 (0.00)	10.69 (0.14)	23.06 (0.01)	-10.48 (0.10)	-25.77 (0.00)	15.18 (0.23)	6.59 (0.09)	-37.69 (0.00)
Fund flow	0.07 (0.17)	0.08 (0.00)	-1.11 (0.00)	0.08 (0.02)	-0.05 (0.77)	1.62 (0.00)	1.65 (0.00)	-0.14 (0.00)	0.06 (0.30)	-0.14 (0.00)
CRSP TR	0.71 (0.04)	-2.59 (0.00)	-3.71 (0.00)	3.99 (0.00)	-11.07 (0.00)	-1.14 (0.02)	3.89 (0.00)	-0.29 (0.68)	3.56 (0.00)	4.38 (0.01)
High AS	1.04 (0.14)	0.25 (0.74)	-1.76 (0.00)	7.07 (0.00)	-12.94 (0.00)	-2.96 (0.00)	-2.93 (0.02)	-2.52 (0.19)	10.07 (0.00)	12.25 (0.00)
Low AS	-3.55 (0.00)	-3.25 (0.00)	-5.64 (0.00)	-6.61 (0.00)	-15.63 (0.00)	-2.41 (0.02)	-8.03 (0.00)	-7.95 (0.00)	-1.46 (0.00)	-0.02 (0.99)
High AS*TR	4.17 (0.00)	4.28 (0.00)	8.25 (0.00)	-1.28 (0.18)	10.39 (0.00)	-1.84 (0.00)	0.01 (0.99)	-1.50 (0.23)	-3.69 (0.00)	-9.88 (0.00)
Low AS*TR	0.94 (0.03)	5.18 (0.00)	2.17 (0.03)	2.25 (0.01)	15.55 (0.00)	2.03 (0.00)	-1.31 (0.04)	4.80 (0.00)	-2.48 (0.00)	-2.62 (0.13)

Conclusions

- Long-term funds deliver superior abnormal returns and exhibit higher risk-adjusted performance than short-term funds.
- Stocks largely held by long-horizon funds outperform stocks largely held by short-horizon funds by roughly 2.7%–3.5% per year over the following five years.
- Long-horizon fund managers are skillful to identify superior long-term firm fundamentals.
- Fund investment horizon identifies, cross-sectionally, mutual funds with intrinsic skills, while turnover reflects time-series variation in skills of funds having short-term investment opportunities
- Holdings-based investment horizon as a useful novel proxy for investment skill which is not contained in other measures