
A Matter of Style: The Causes and Consequences of Style Drift in Mutual Fund Portfolios

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Style Investing is a Common Approach to the Portfolio Allocation Problem

- Investors, especially institutional, categorize stocks and funds into:
 - Small cap vs. large cap
 - Growth vs. value
 - Technology vs. stable
 - Momentum vs. contrarian
 - ... and other style categories

However, Little is Known About the Dynamics of this Approach

- Some interesting issues include:
 - Does style specialization improve performance?
 - Do institutions actively control their style drift?
 - Should we constrain active managers to stick to their “style box”?
- My paper investigates these issues

Academic Studies on Style Investing

- ❑ Grinblatt, Titman, and Wermers (1995)
 - Find evidence of active momentum as a common style of mutual funds
 - ❑ Funds buy winners and (to a lesser degree) sell losers
 - ❑ Carhart (1997)
 - Mutual funds experience momentum by good luck, then ride the momentum the following year
 - ❑ After controlling for momentum, no alpha
 - ❑ Chen, Jegadeesh, and Wermers (2000)
 - The mutual fund industry has a preference for liquid, growth, and momentum stocks
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My Contributions

- 1. What types of funds experience style drift?
 - Smallest cap funds have almost twice the style drift of largest cap funds
 - But, even large cap funds exhibit significant style drift
 - Growth funds exhibit slightly higher style drift than value funds
- 2. What is the trend in style drift?
 - An initial increase in style drift following 1975 removal of fixed trading costs
 - Significant decline since mid-1980s, even though trading costs have decreased substantially

My Contributions

- 3. Does style drift help or hurt performance?
 - Funds with more “active style drift” (style drift through trading) have significantly higher alphas
- 4. Do funds aggressively control style drift?
 - The average fund manager does not seem overly concerned with style drift
 - More concern with drift over time, however
 - Influence of the Morningstar Style Boxes?

Opposing Views on Style Drift

- Style drift should be controlled tightly
 - Specialization of skills
 - Risk management/portfolio diversification
- Style drift should not be controlled
 - Specialization is not style specific
 - Industry or strategy, not style
 - Constrained optimization always produces less favorable outcomes

Brief History of Style Investing

- Prior to the 1990s, many more “balanced” funds
 - Asset allocation and sector allocation decisions handled by the manager
- Morningstar introduced “Style Box” in 1992
 - “...to help investors and advisors determine the investment style of a fund.”
 - “Different investment styles often have different levels of risk and lead to differences in returns. Therefore, it is crucial that investors understand style and have a tool to measure their style exposure.”

Style Investing Today

- Most mutual fund managers have a style specialization
- SEC requires that 80% of securities in portfolio must be consistent with fund name
- Many funds use a “style word” in their names, e.g., “Legg-Mason Value Trust,” “Fidelity Aggressive Growth,” “PIMCO Small Cap StocksPLUS”

Potential Purposes of Style Investing

- ❑ Simple marketing gimmick
 - Appeals to investors who need organizing principles
 - ❑ Barberis and Shleifer (JFE, 2003) model “style investors”
- ❑ Risk control
 - Need to understand how investment “pieces” fit together
 - ❑ Appears to be Morningstar’s original intent
- ❑ Commitment device
 - Manager signals true skills within a style specialization
 - Fund prospectuses seem focused on this purpose!

Methodology

Style Classification Based on Stock Characteristics (DGTW (1997))

- Non-covariance based matching—matching based on characteristics, not based on factor loadings derived from regressions
 - Sharpe (1992) moving regressions are excellent, when only returns are available!
- We form quintiles of CRSP stocks based on (1) size, (2) book-to-market, and (3) prior-year return
 - 125 value-weighted control portfolios (5x5x5)

Analyzing Style Drift

- Rank all NYSE stocks by Mkt. Cap. -
Divide into 5 Quintiles
- Rank Quintiles = Book Value/Market Value (BTM)
Subdivide into 5 more quintiles
- Rank the 25 fractiles by past year stock return
Subdivide into 5 more quintile

A rank of:

Size=5,
Large Cap

BTM=5,
High BTM

PR1YR=5
High Past Return

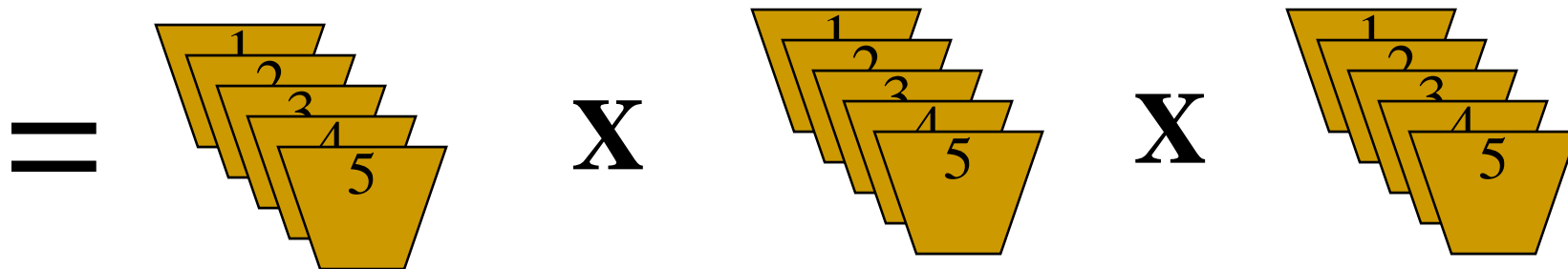
RANK ALL STOCKS

NYSE - CRSP DATA

**Capitalization
Size**

**Book To Market
BTM**

**PR1YR
RETURN**



1 = Smallest Cap

1 = Lowest BTM

1 = Lowest RTN

5 = Largest Cap

5 = Highest BTM

5 = Highest RTN

**POSSIBLE
RANKINGS**

$$= (\text{SIZE} \quad \text{BTM} \quad \text{PR1YR}) = 125$$

$$= (\quad 5 \quad \times \quad 5 \quad \times \quad 5 \quad) = 125$$

Measuring Style Drift

- What are the sources of style drift?
 - 1. Stock-level drift
 - 2. Portfolio-weight drift
 - 3. Active trading drift
- Important to separate “passive style drift” from “active style drift”

Measuring Style Drift

- Total Style Drift (TSD) in style dimension l

$$TSD_t^l = \sum_{j=1}^N (\tilde{w}_{j,t} \tilde{C}_{j,t}^l - \tilde{w}_{j,t-1} \tilde{C}_{j,t-1}^l)$$

- $\tilde{w}_{j,t}$ = stock j portfolio weight at end-of-quarter t
- $\tilde{C}_{j,t}^l$ = stock j characteristic at end-of-quarter t in style dimension l

Total Style Drift Decomposition

$$TSD_t^l = PSD_t^l + ASD_t^l$$

- Passive Style Drift (PSD)—change in style during quarter t assuming buy-and-hold:

$$PSD_t^l = \sum_{j=1}^N (\tilde{w}'_{j,t} \tilde{C}_{j,t}^l - \tilde{w}_{j,t-1} \tilde{C}_{j,t-1}^l)$$

- Active Style Drift (ASD)—change in style due to actual portfolio, relative to buy-and-hold portfolio:

$$ASD_t^l = \sum_{j=1}^N (\tilde{w}_{j,t} \tilde{C}_{j,t}^l - \tilde{w}'_{j,t} \tilde{C}_{j,t}^l)$$

Averaging TSD Across “M” Funds

$$\overline{TSD}_t^l = \frac{1}{M} \sum_{m=1}^M |TSD_{m,t}^l|$$

- By triangle inequality,

$$\overline{TSD}_t^l \leq \overline{PSD}_t^l + \overline{ASD}_t^l$$

- Note that $[\overline{PSD}_t^l + \overline{ASD}_t^l] - \overline{TSD}_t^l$:
 - Large for “Style Constant” fund ($\overline{TSD}_t^l = 0$)
 - Small for “Style Chasing” fund
 - $\overline{TSD}_t^l = \overline{PSD}_t^l + \overline{ASD}_t^l$

Measuring Performance Impact

- Return due to Passive Style Drift

$$PSDR_{t-k,t}^{BTM} = \sum_{j=1}^N (\tilde{w}'_{j,t} - \tilde{w}_{j,t-k}) (R_{t+1}^{BTM} - \bar{R}^{BTM})$$

- Return due to Active Style Drift

$$ASDR_{t-k,t}^{BTM} = \sum_{j=1}^N (\tilde{w}_{j,t} - \tilde{w}'_{j,t}) (R_{t+1}^{BTM} - \bar{R}^{BTM})$$

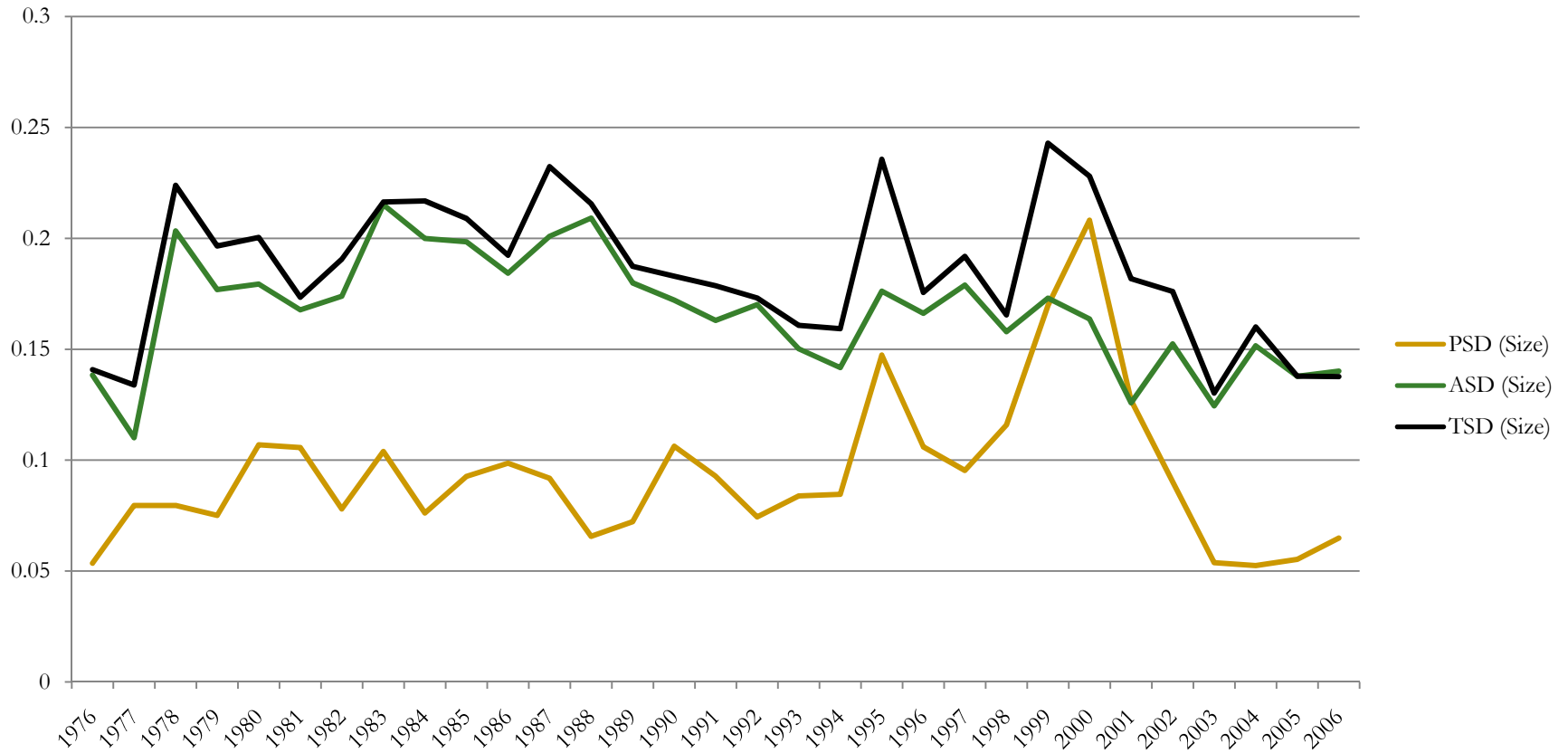
Data

- Thomson quarterly mutual fund holdings
- U.S. domestic equity
- 1975 to 2006
- Matched with fund returns and characteristics (TNA, expenses, etc.) using MFLINKS (available at Wharton WRDS)
- Matched with manager characteristics (experience, track-record) using Morningstar, Wiesenberger, etc.

Results

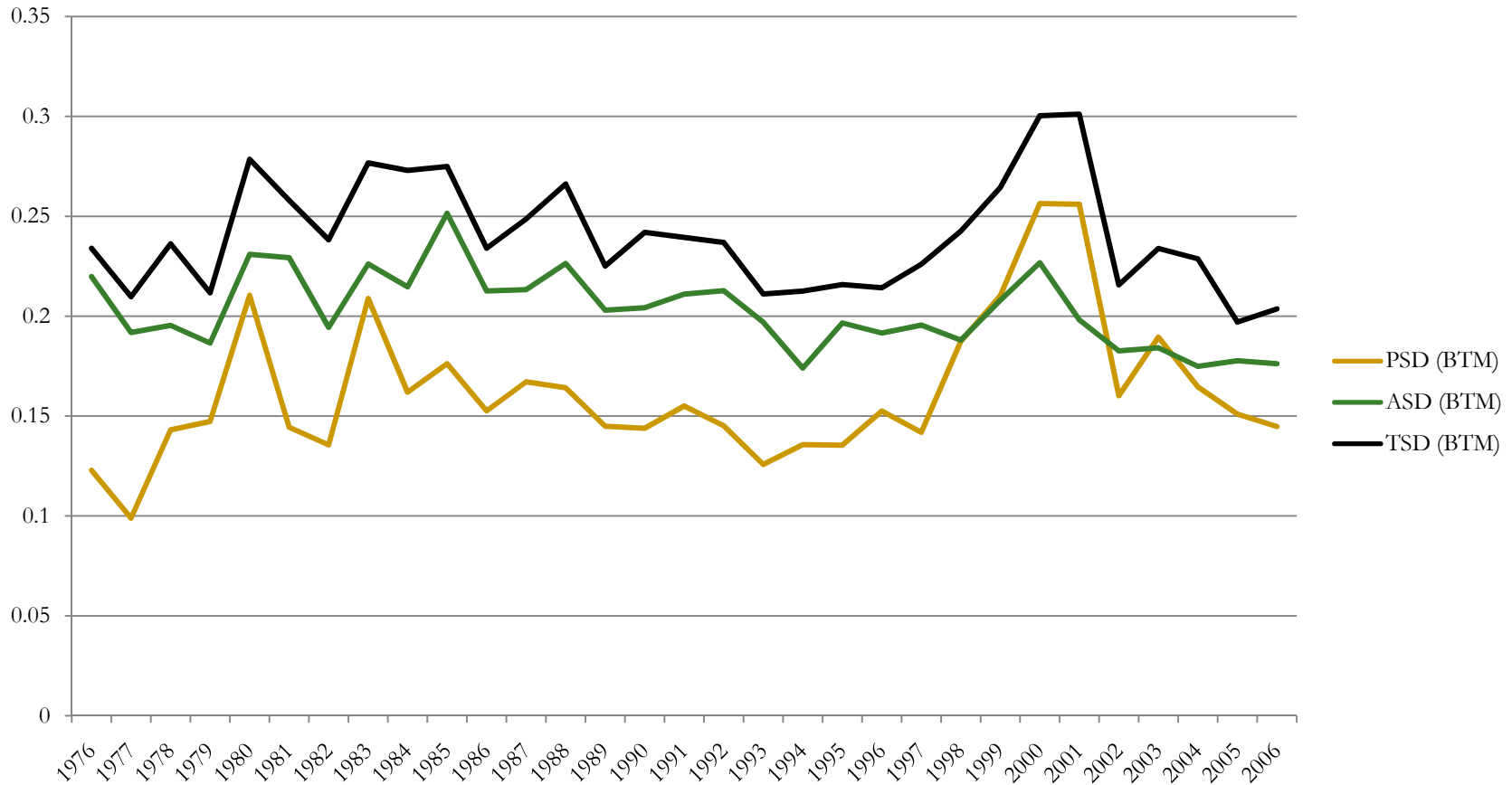
A 31-Year Look at Style Drift

Size Dimension



A 31-Year Look at Style Drift

BTM Dimension



A 31-Year Look at Style Drift

Momentum Dimension

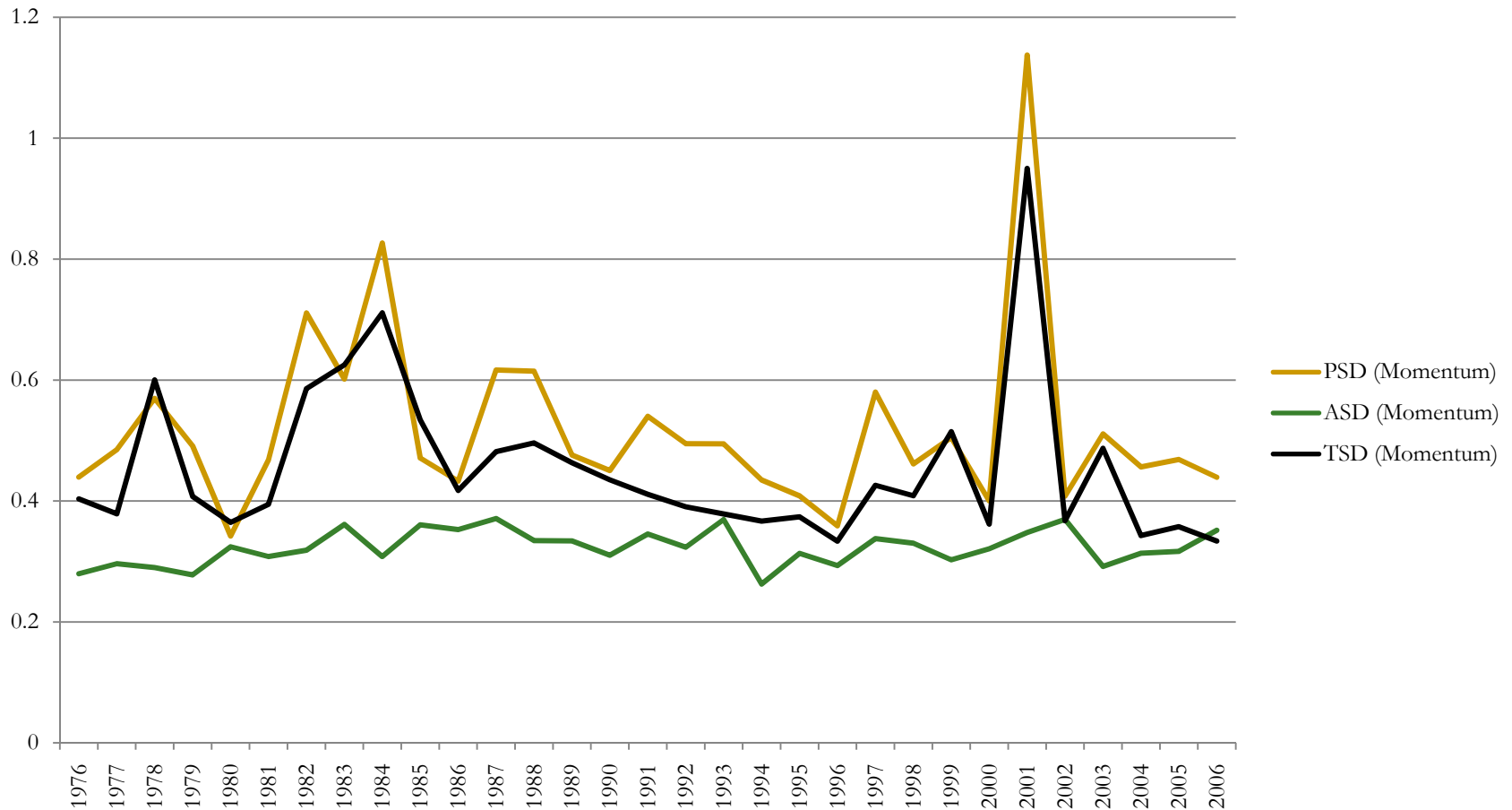


Table 3: Fund Characteristics and Style Drift

□ Growth Funds, averaged over all years:

Ranking Variable = Total Net Assets			
Fractile	Number	Total Net Assets (\$Millions)	Total Style Drift (Style Number)
Top 10 % (Large Funds)	68	2,708	0.63
10-20 %	68	696	0.74
20-30 %	68	378	0.74
30-40 %	68	227	0.81
40-50 %	68	144	0.80
50-60 %	68	92	0.87
60-70%	68	57	0.89
70-80%	68	33	0.90
80-90%	68	18	1.00
Bottom 10% (Small Funds)	68	14	1.10
Top-Bottom 10%	—	—	-0.47***
All Funds	678	437	0.87

Table 3: Fund Characteristics and Style Drift

- Value Funds, averaged over all years:

Ranking Variable = Total Net Assets			
Fractile	Number	Total Net Assets (\$Millions)	Total Style Drift (Style Number)
Top 10 % (Large Funds)	31	5,150	0.51
10-20 %	31	1,389	0.61
20-30 %	31	651	0.70
30-40 %	31	356	0.68
40-50 %	31	212	0.76
50-60 %	31	131	0.76
60-70%	31	83	0.75
70-80%	31	47	0.80
80-90%	31	23	0.86
Bottom 10% (Small Funds)	31	17	0.95
Top-Bottom 10%	—	—	-0.45***
All Funds	308	806	0.75

Table 4: Characteristics of Funds and Managers with High vs. Low Active Style Drift (ASD)

Ranking Variable = ASD	Avg	Avg	Active	Total	Portfolio	Same Stock	Career	Career	Career	Mgr
Fractile	No	TNA (\$mil)	Style Drift (Style #)	Style Drift (Style #)	Turnover (%/yr)	\$Buys (% of Buys)	Aggress. (%/yr)	Experience (Months)	CST (%/yr)	Replace. (%/yr)
Top 5 % (Most Drift)	33	240	1.83	1.49	143	28.2	131	129	2.26	4.1
Top 10 %	66	306	1.59	1.33	143	29.3	129	123	2.21	3.2
Top 20 %	132	421	1.34	1.17	134	30.1	122	118	1.83	1.9
2nd 20 %	132	629	0.82	0.90	101	34.7	100	95	1.13	2.1
3rd 20 %	132	714	0.59	0.75	78	37.5	82	99	0.76	1.9
4th 20 %	132	781	0.41	0.63	55	43.9	58	113	0.92	1.7
Bottom 20 %	132	1,335	0.22	0.53	34	50.9	42	135	0.99	1.7
Bottom 10%	66	1,413	0.16	0.50	27	54.2	33	141	0.87	2.5
Bottom 5% (Least Drift)	33	1,562	0.11	0.47	26	55.8	33	136	0.96	3.4
All Funds	660	776	0.68	0.80	81	39.4	80	112	1.09	1.9

Table 5: Performance Implications of High vs. Low Active Style Drift (ASD)

(Funds ranked on 3-year past ASD)

■ Following-year portfolio-level alpha

Ranking Variable = Active Style Drift			
Fractile	Avg No	Avg TNA	Year +1
Top 5 %	33	240	3.43**
Top 10 %	66	306	3.23**
Top 20 %	132	421	1.80**
2nd 20 %	132	629	0.71
3rd 20 %	132	714	-0.07
4th 20 %	132	781	0.99
Bottom 20 %	132	1,335	0.67
Bottom 10%	66	1,413	0.27
Bottom 5%	33	1,562	0.50
Top-Bottom 5%	33	—	2.93**
Top-Bottom 10%	66	—	2.97**
Top-Bottom 20%	132	—	1.13**
All Funds	660	776	0.75*

Interpretation

- More aggressive managers of smaller funds with good track-record have highest ASD
- Higher ASD leads to significantly higher pre-cost alphas
 - Expense ratios and trade cost estimates indicate that some of this alpha would survive costs

Direct Return Effect of Style Drift

(Style timing using PSDR and ASDR, %/quarter)

Summary of Findings

- Paper develops new holdings-based methodology to measure
 - Active style drift (ASD)
 - Passive style drift (PSD)
 - Active style drift returns (ASDR)
 - Passive style drift returns (PSDR)
- Active style drift is declining over time (“closet indexers”?)
- Style drift higher for growth funds, small funds
 - Do large funds get “style boxed-in”?
- Style drift higher for successful managers, both past and future

Future Work

- Compare/contrast holdings-based style measurement (HBSM) with returns-measured style measurement (RBSM)
 - How precise is RBSM, relative to HBSM?
 - How to combine the two methods to extract maximum information on style and style drift?