
How Active Is Your Fund Manager? Active Share and Mutual Fund Performance

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Papers on Active Share

- Active Share and Mutual Fund Performance
 - Working paper, December 2010
- How Active Is Your Fund Manager? A New Measure that Predicts Performance
 - Review of Financial Studies, 2009
- Active Management and Performance by Large Institutions
 - Work in progress
- Papers available at <http://www.petajisto.net/>

Active and Passive Components of a Portfolio

- Decompose portfolio into two parts:

$$\text{Portfolio} = \underbrace{(\text{Index})}_{\text{Passive}} + \underbrace{(\text{Portfolio} - \text{Index})}_{\text{Active}}$$

- E.g. Growth Fund of America:
 - Passive: 100% in S&P 500
 - Active: 54% in long bets, 54% in short bets

A New Measure of Active Management

- Define a measure based on active portfolio holdings:

$$\text{Active Share} = \frac{1}{2} \sum_{i=1}^N |w_{fund,i} - w_{index,i}|$$

- Indicates the size of the active positions as a fraction of the entire portfolio
- Always between 0 and 100% for mutual funds
 - E.g., 54% for Growth Fund of America

Contributions of This Paper

- Active Share
 - New measure of active management
- Characterize active management in US mutual funds
 - Explain active management across funds
 - Document time-series evolution
- Active Share predicts mutual fund returns
 - Before fees: Evidence of managerial ability
 - After fees: Helps investors select mutual funds

Active and Passive Components Again

- Consider the same portfolio decomposition:

$$\text{Portfolio} = \underbrace{(\text{Index})}_{\text{Passive}} + \underbrace{(\text{Portfolio} - \text{Index})}_{\text{Active}}$$

- Expressed in terms of **returns**:

$$R_{\text{Portfolio}} = R_{\text{Index}} + R_{\text{Active}}$$

- **Tracking error** is commonly defined as:

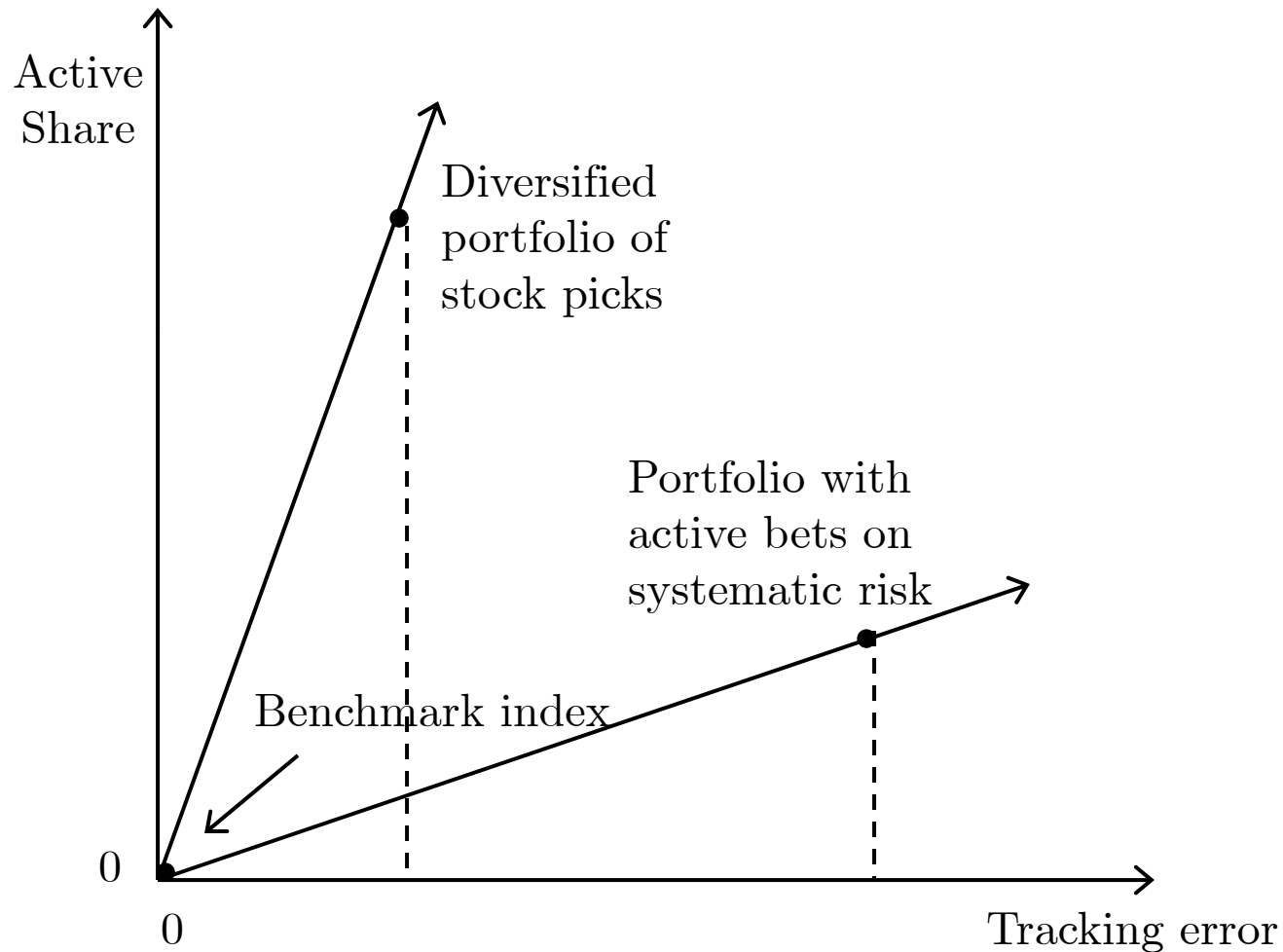
$$\begin{aligned}\sigma_{\varepsilon} &= \text{Stdev}[R_{\text{Active}}] \\ &= \text{Stdev}[R_{\text{Portfolio}} - R_{\text{Index}}]\end{aligned}$$

Interpretation: Active Positions vs. Volatility

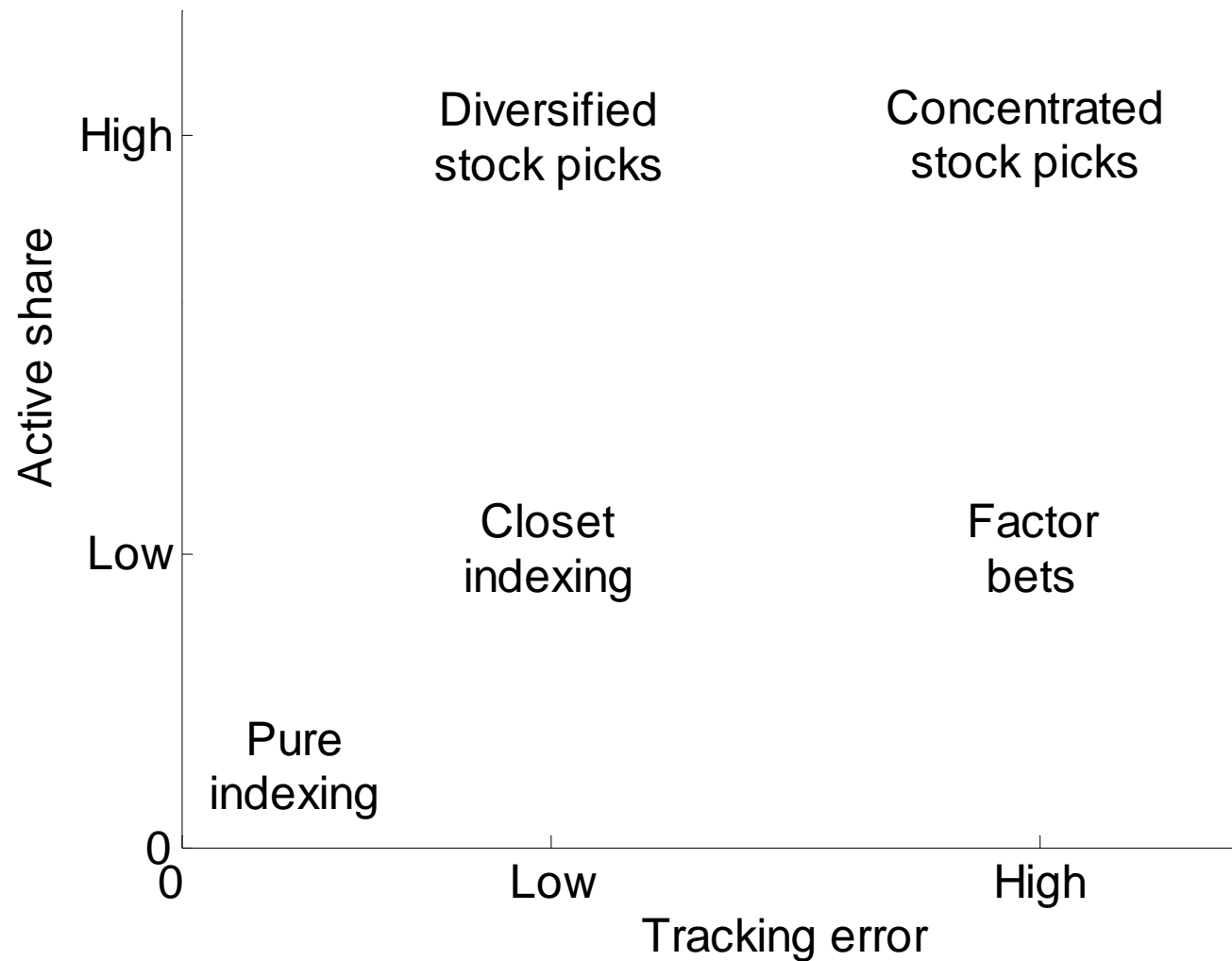
Does it matter which measure we use?

- Consider a portfolio with 50 stocks
- Crucial question: Do the active positions have net exposure to **systematic** risk?
 - If Yes \Rightarrow **High** tracking error
 - Holds even if active positions relatively small
 - If No \Rightarrow **Low** tracking error
 - Holds even if active positions relatively large
- Active share and tracking error emphasize different aspects of active management

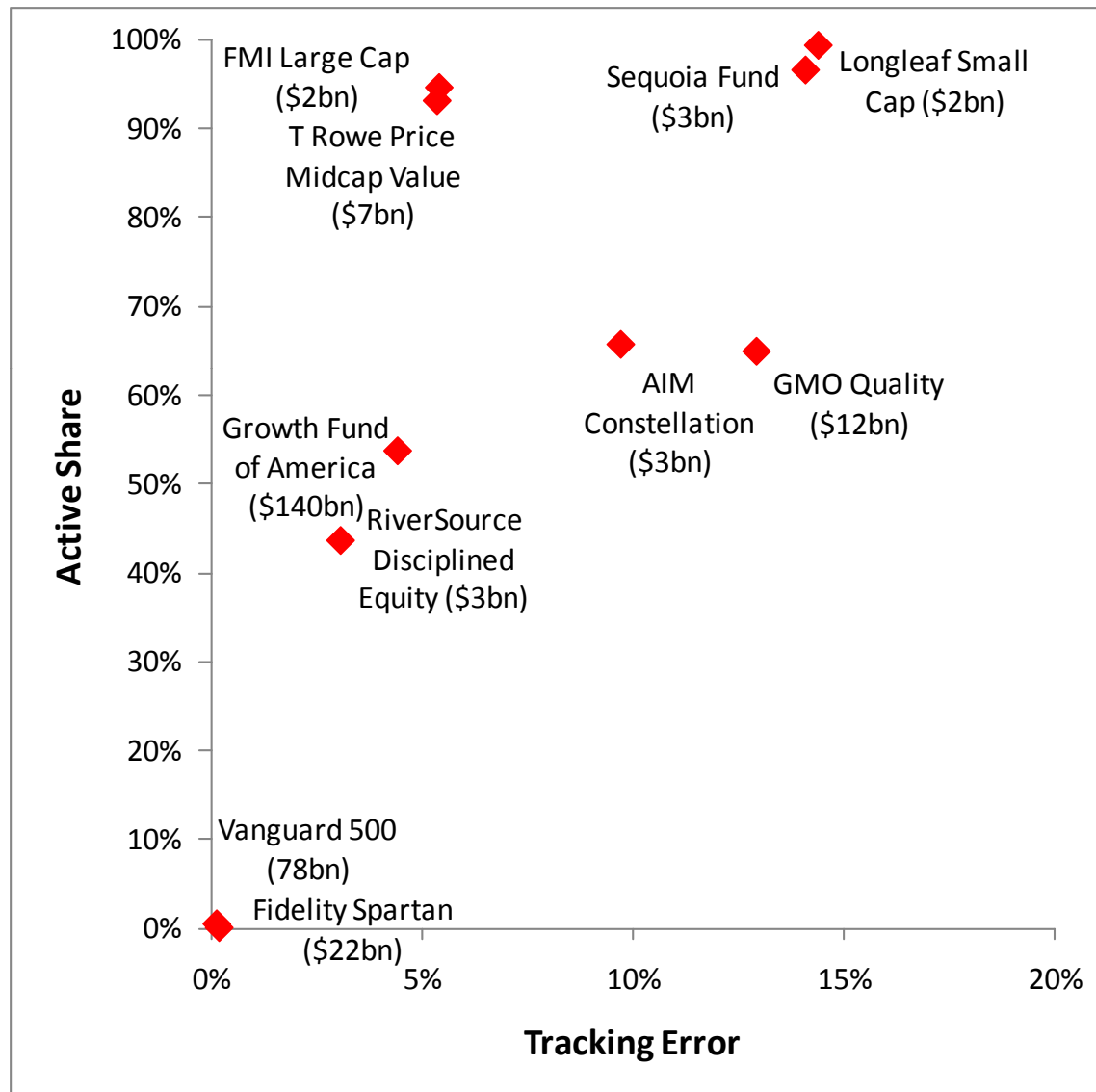
Two Types of Active Management



Combining Active Share and Tracking Error

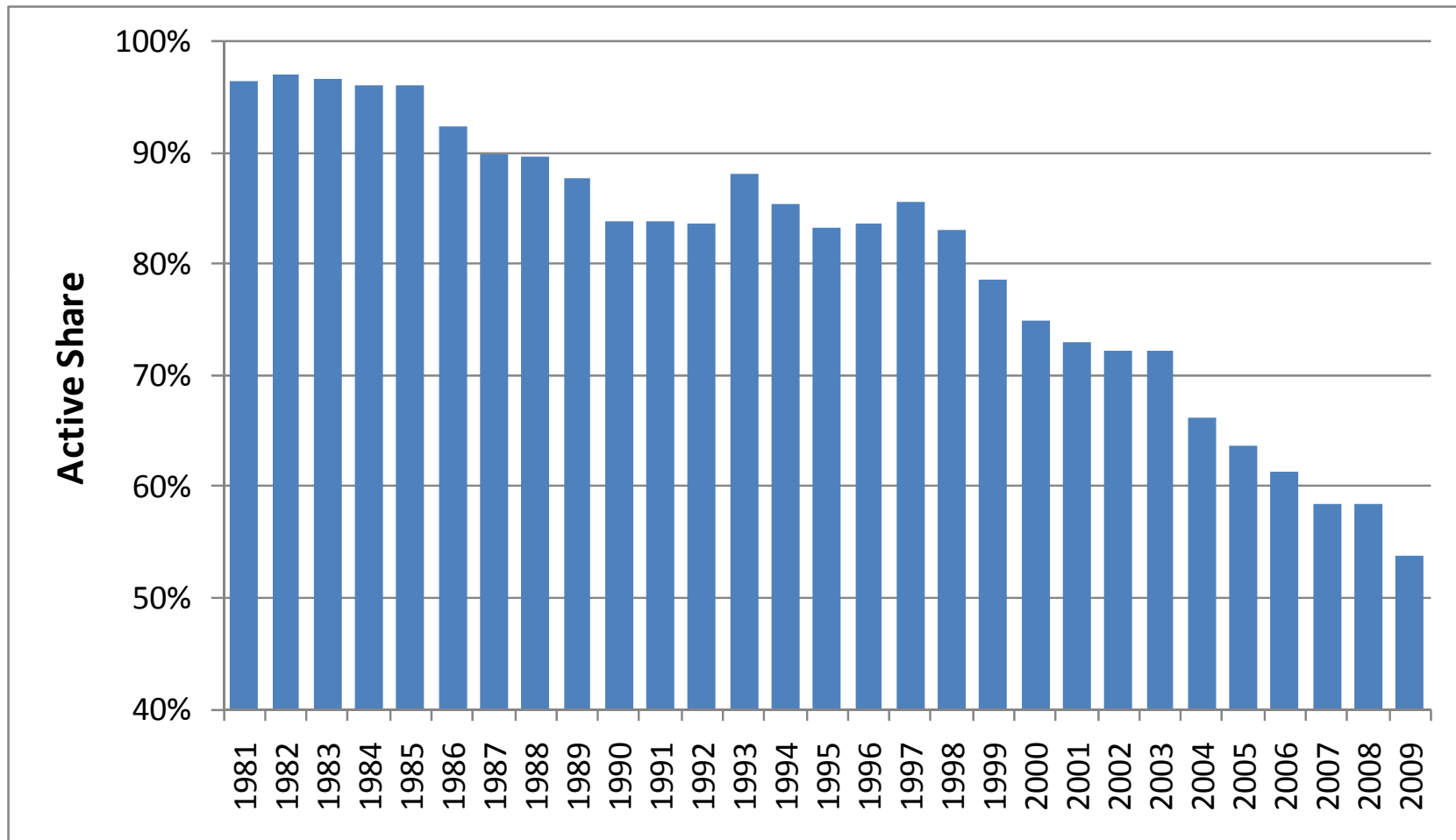


Active Management Types in 2009



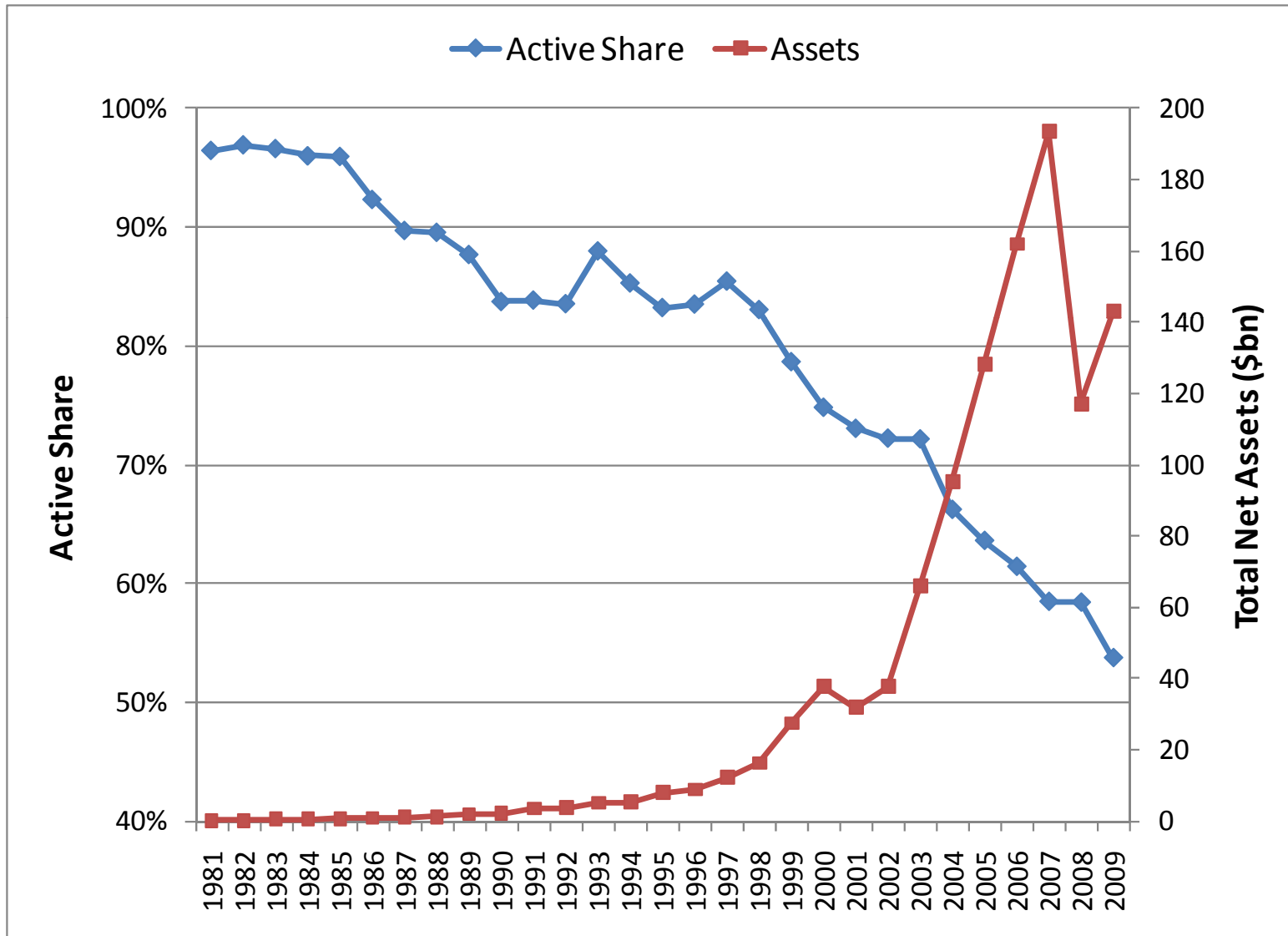
From Active Management to Closet Indexing

Growth Fund of America

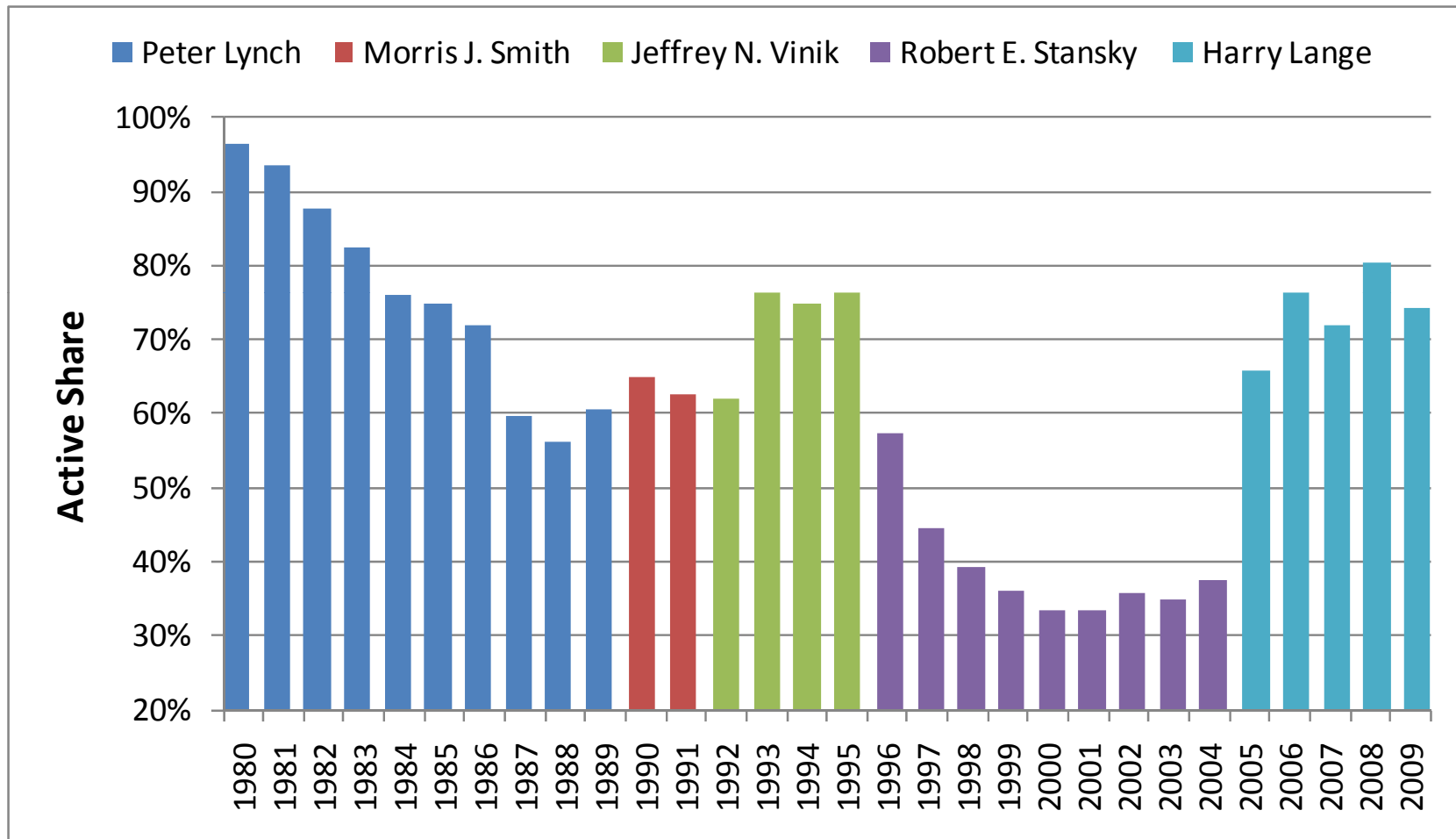


More Assets, Less Active Management

Growth Fund of America



Magellan's Period of Closet Indexing



Active Share as a Summary Statistic

Benefits relative to other measures include:

- Easy economic interpretation
- Not subject to statistical errors (cf. tracking error)
- Can be computed at any point in time
 - Requires no prior history
 - Can measure sudden changes in active management
- Comparable across different benchmark indexes
- Hard to “game” (cf. turnover)

Both Measures Could Predict α

- **Ex ante** either measure could predict α
 - This relationship is an empirical question
- **Ex post** it turns out only Active Share predicts α
 - Stock picking is rewarded in the market
 - Systematic factor bets are not rewarded

Data Sources

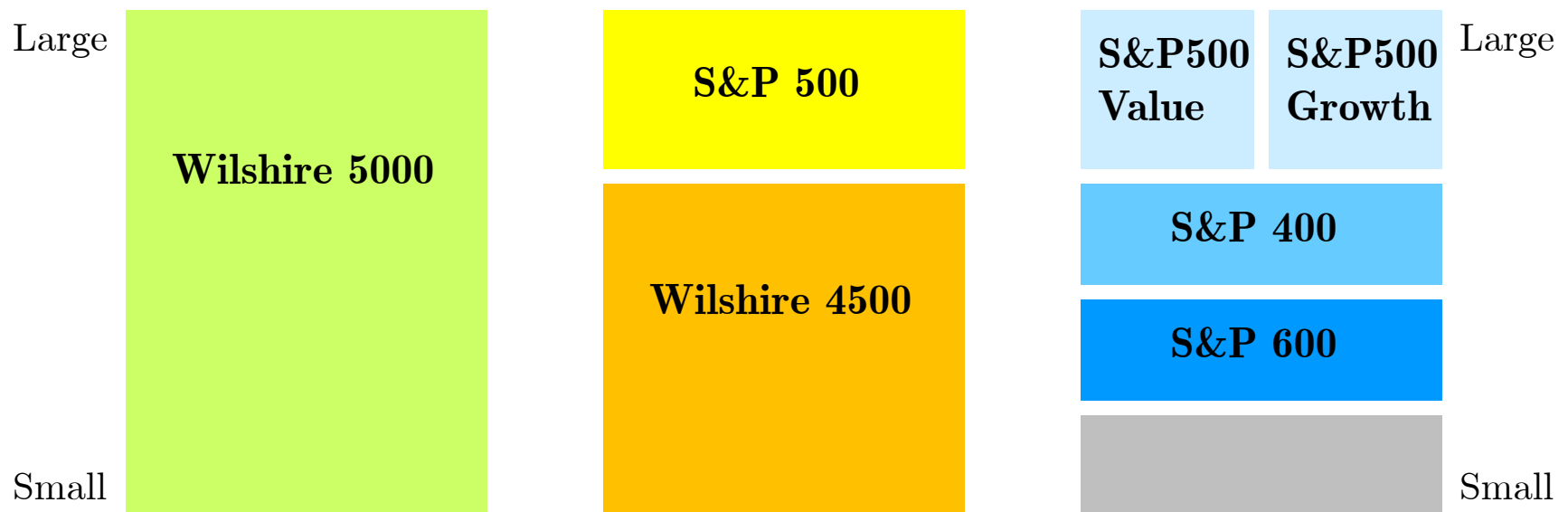
- Mutual fund portfolio holdings
 - Thomson Reuters
- Benchmark index holdings
 - Directly from index providers
- Fund returns
 - Monthly returns from CRSP
 - Daily returns from CRSP, Yale ICF, and S&P
- Index returns
 - Monthly returns from index providers
 - Daily returns from index providers

Methodology: Sample Selection

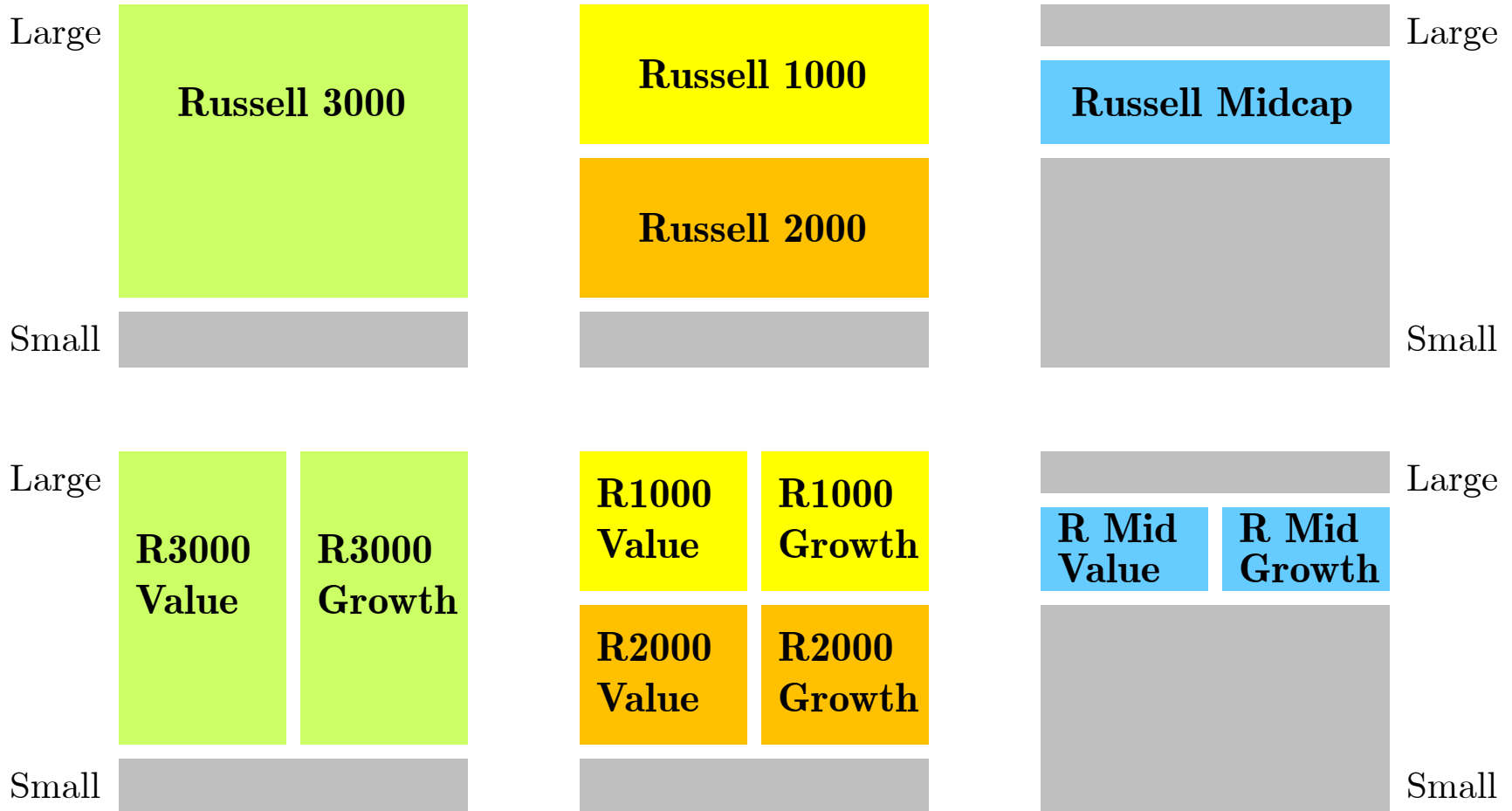
Pick all-equity US mutual funds

- Exclude balanced, asset allocation, bond, international, precious metal, and sector funds
- Final sample:
 - 2,740 funds in 1980-2009
 - 81,158 fund-rdate observations

Benchmark Indexes: S&P and Wilshire



Benchmark Indexes: Russell



Selection of Benchmark Index

- Use “official” benchmark index specified by each fund in its prospectus
 - Data from Morningstar as of 1/2007 and 3/2010
- If benchmark not available:
 - Compute Active Share with respect to all indexes
 - Pick the index that produces the lowest Active Share over the last three years

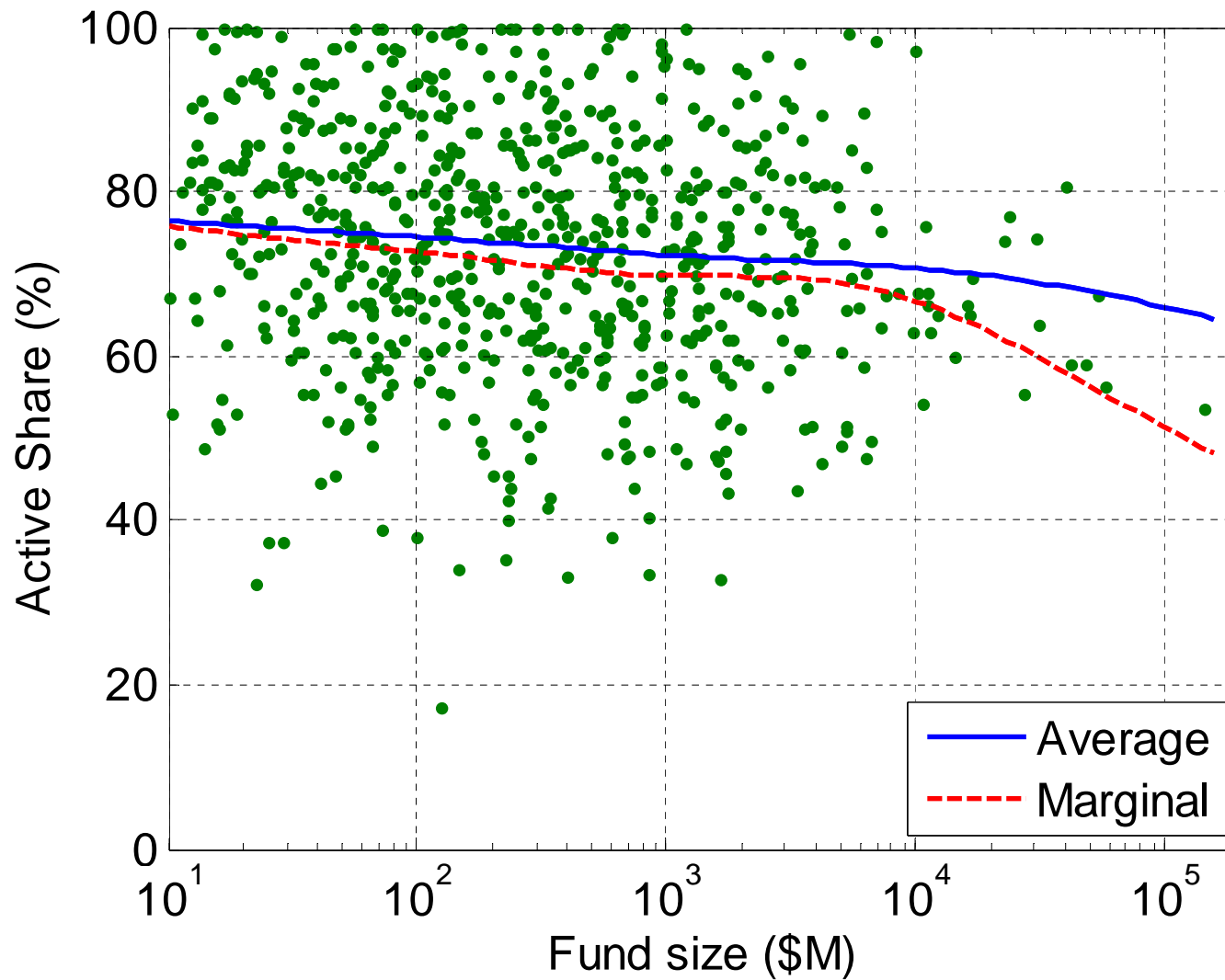
Distribution of Funds in 2009

Number of Funds

Active Share (%)	Tracking error (% per year)								All
	0-2	2-4	4-6	6-8	8-10	10-12	12-14	>14	
90-100			6	36	66	47	44	87	285
80-90			35	83	67	55	35	50	326
70-80		7	56	62	63	33	17	19	257
60-70		22	85	60	25	13	5	6	216
50-60		24	49	25	14	4	2		120
40-50	2	28	20	6	3				61
30-40	4	14	9	2					30
20-30		3							5
10-20	5	3							8
0-10	70								73
All	82	104	262	275	238	152	103	164	1,380

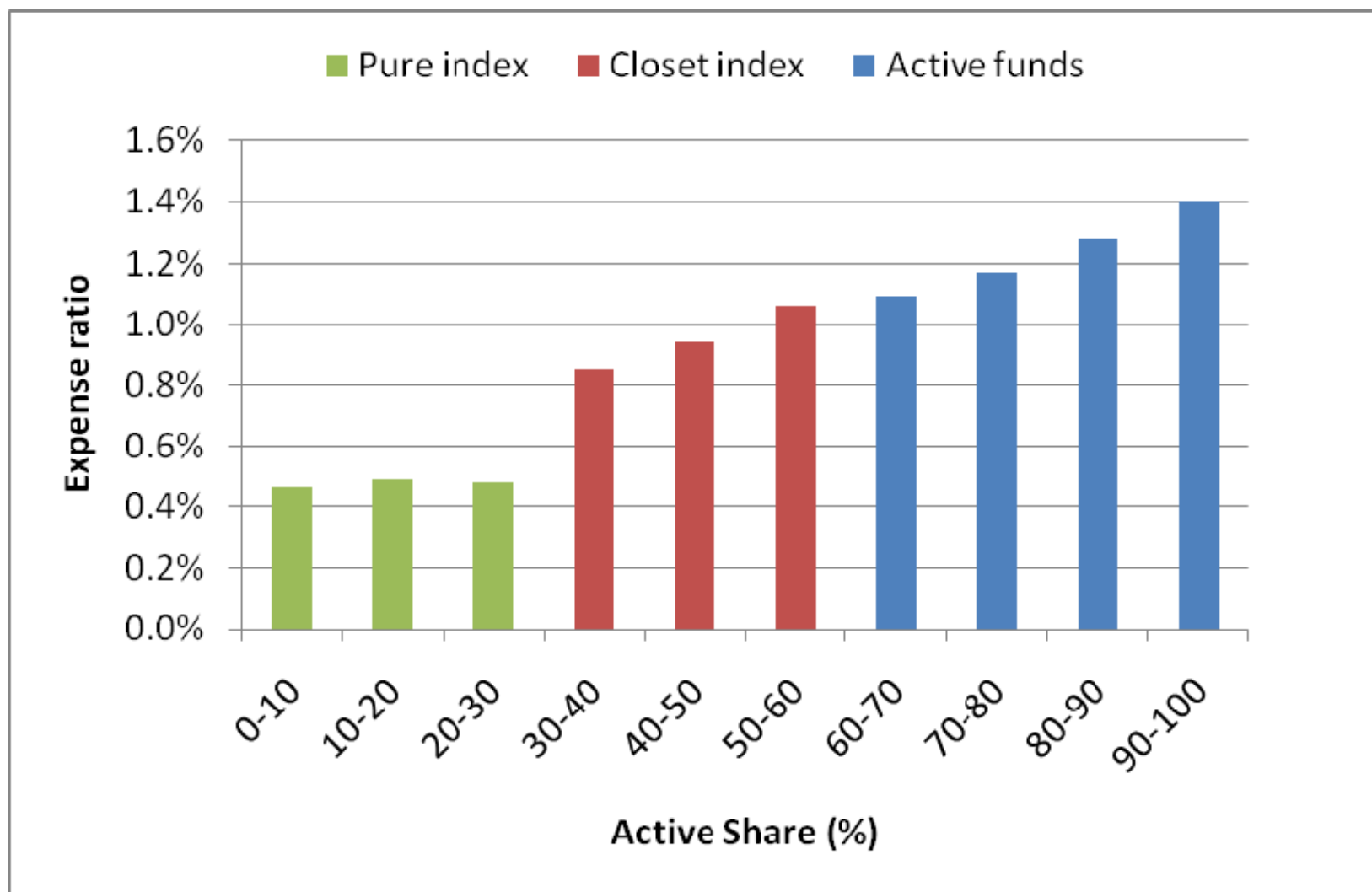
Fund Size and Active Management

Large-Cap Funds

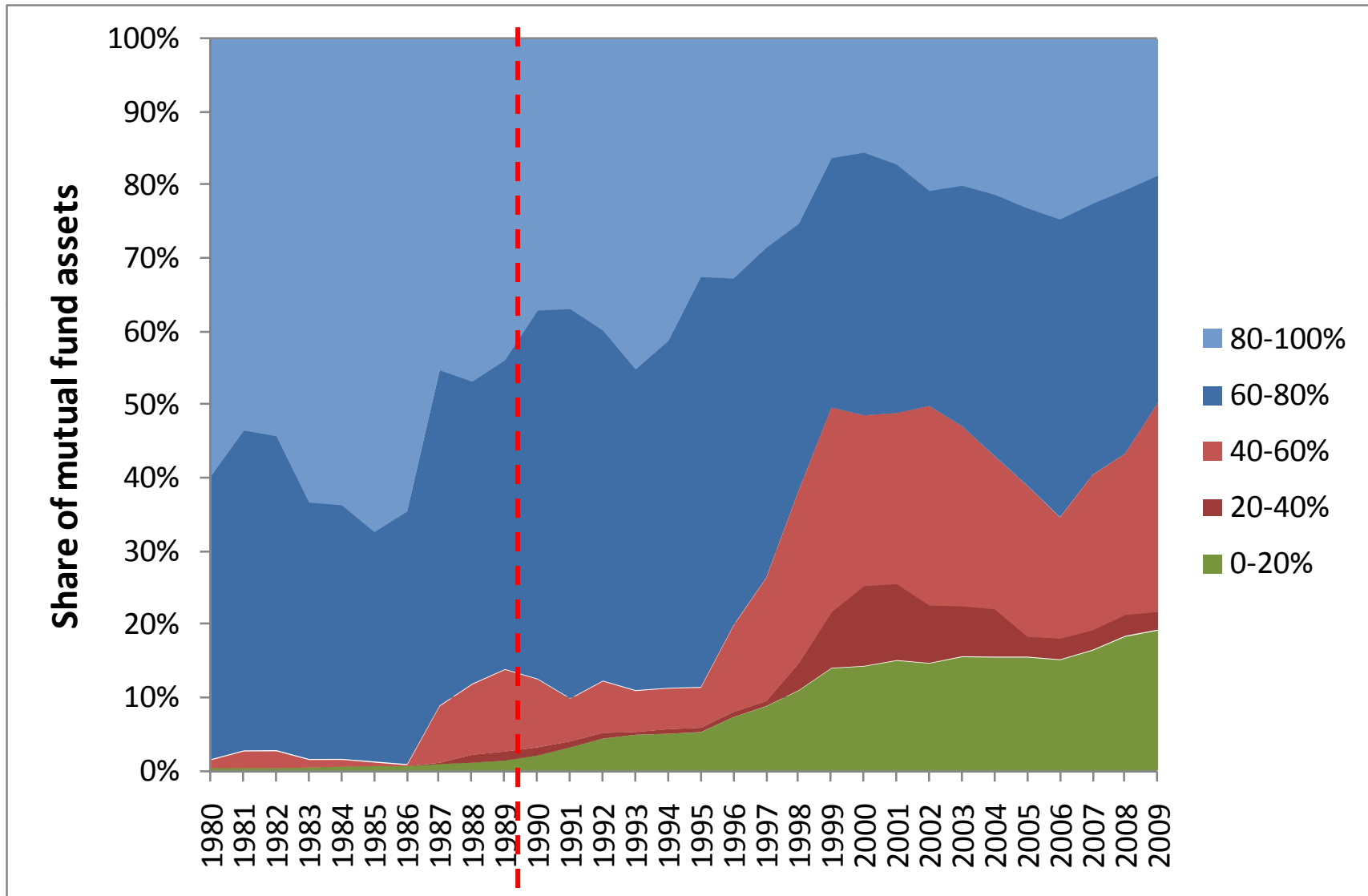


Fees and Closet Indexing






























Equal-Weighted Total Expense Ratio (%)



Evolution of Active Share over Time



Creating Categories of Active Management

Active Share quintile	Tracking error quintile					Group Label
	Low	2	3	4	High	
High						 Stock pickers
4						 Concentrated
3						 Factor bets
2						 Moderately active
Low						 Closet indexers

The Most Active Funds Have Skill

Benchmark-Adjusted Gross Return (Before Expenses)

Group	Label	Benchmark-adjusted	Four-factor alpha
5	Stock pickers	2.61 (3.42)	2.10 (2.72)
4	Concentrated	1.64 (0.90)	0.52 (0.40)
3	Factor bets	0.06 (0.06)	-1.02 (-1.47)
2	Moderately active	0.82 (1.63)	0.20 (0.39)
1	Closet indexers	0.44 (1.67)	0.13 (0.51)
	All	0.96 (1.70)	0.31 (0.61)
5 - 1	Difference	2.17 (3.31)	1.96 (3.04)

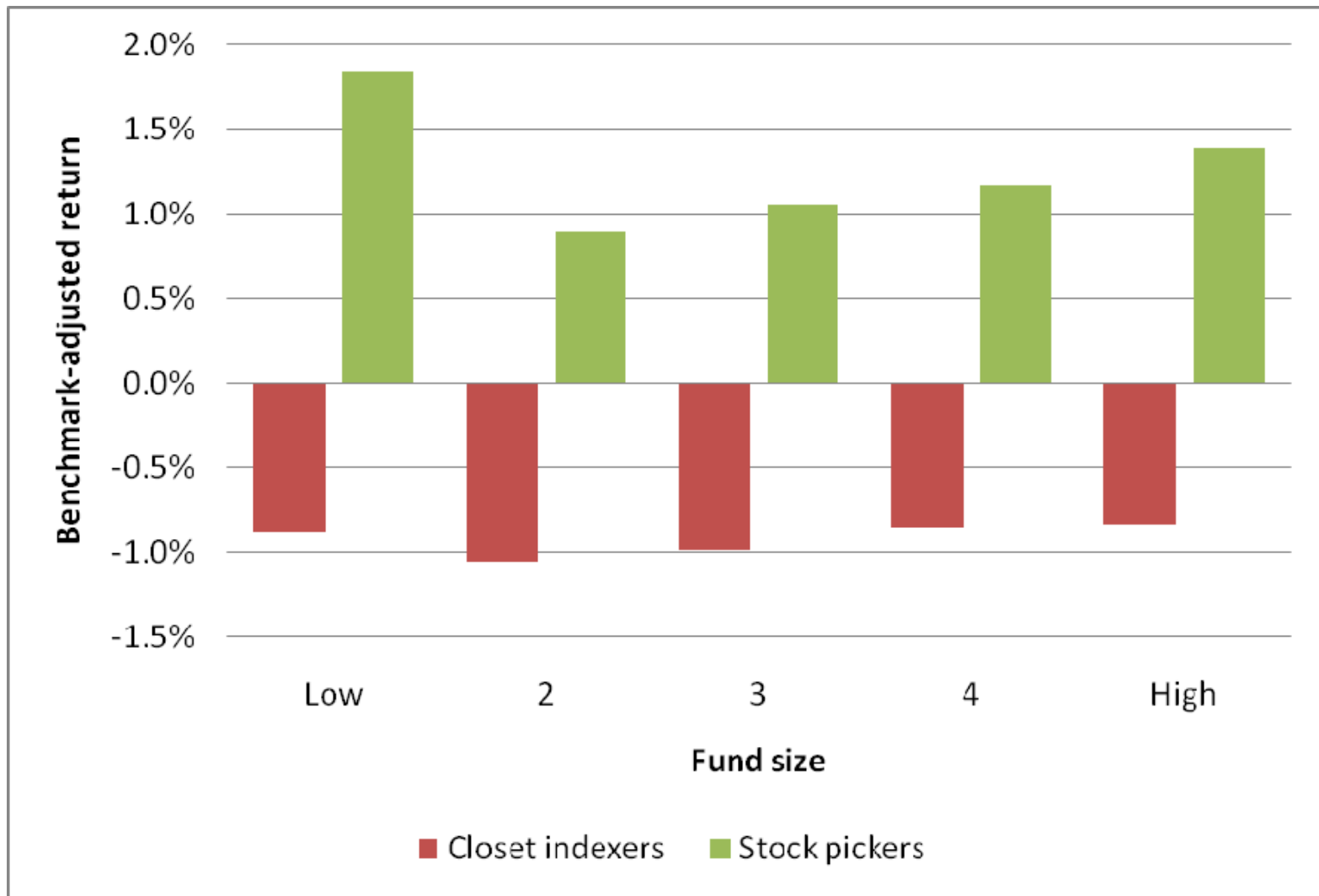
Investors Should Avoid Less Active Funds

Benchmark-Adjusted Net Return (After Expenses)

Group	Label	Benchmark-adjusted	Four-factor alpha
5	Stock pickers	1.26 (1.95)	1.39 (2.10)
4	Concentrated	-0.25 (-0.17)	-0.89 (-0.72)
3	Factor bets	-1.28 (-1.31)	-2.19 (-3.01)
2	Moderately active	-0.52 (-1.16)	-0.78 (-1.81)
1	Closet indexers	-0.91 (-3.38)	-1.07 (-4.46)
	All	-0.41 (-0.86)	-0.71 (-1.59)
5 - 1	Difference	2.17 (3.48)	2.45 (4.00)

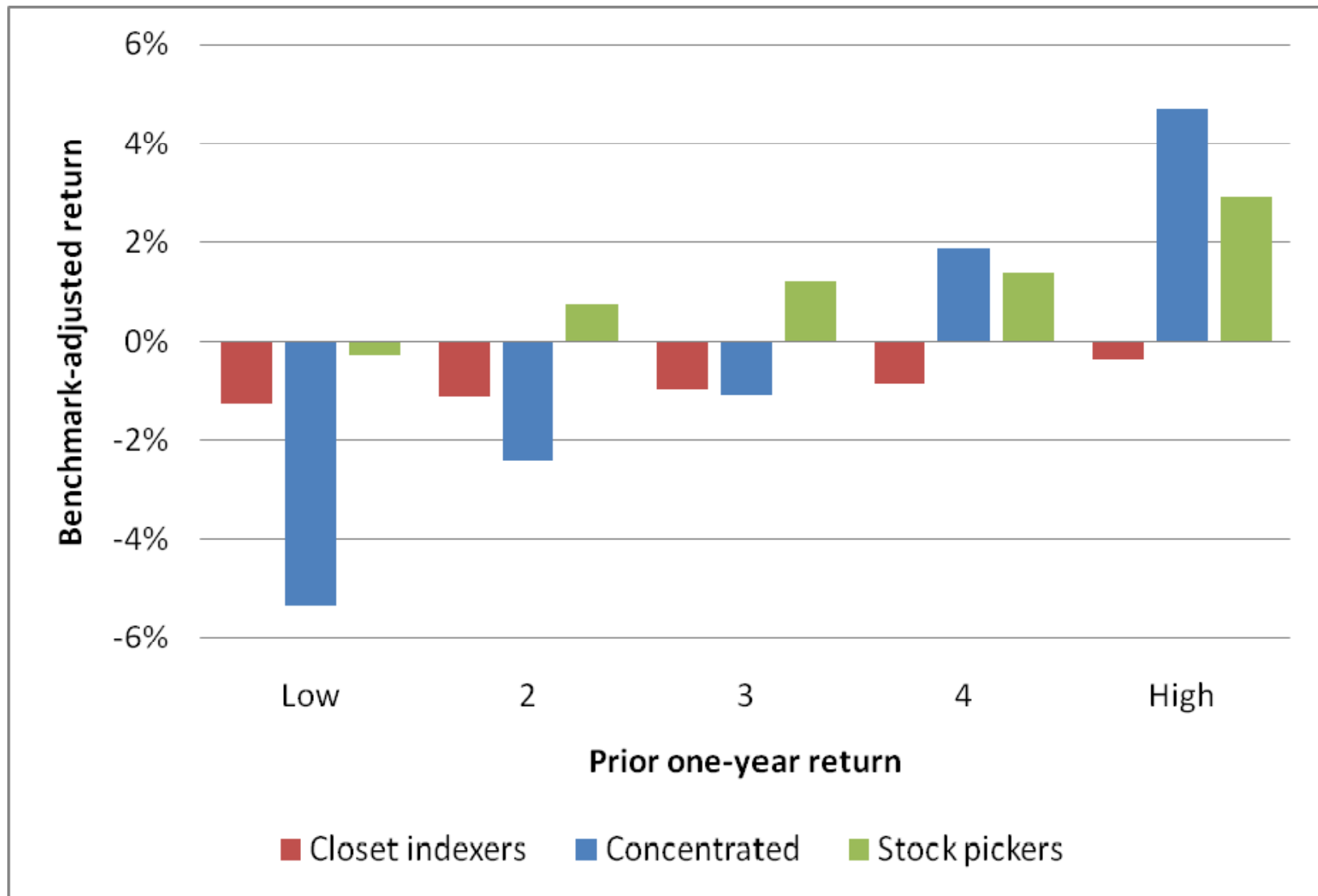
Similar Performance Across Small and Large Funds

Benchmark-Adjusted Net Return (After Expenses)



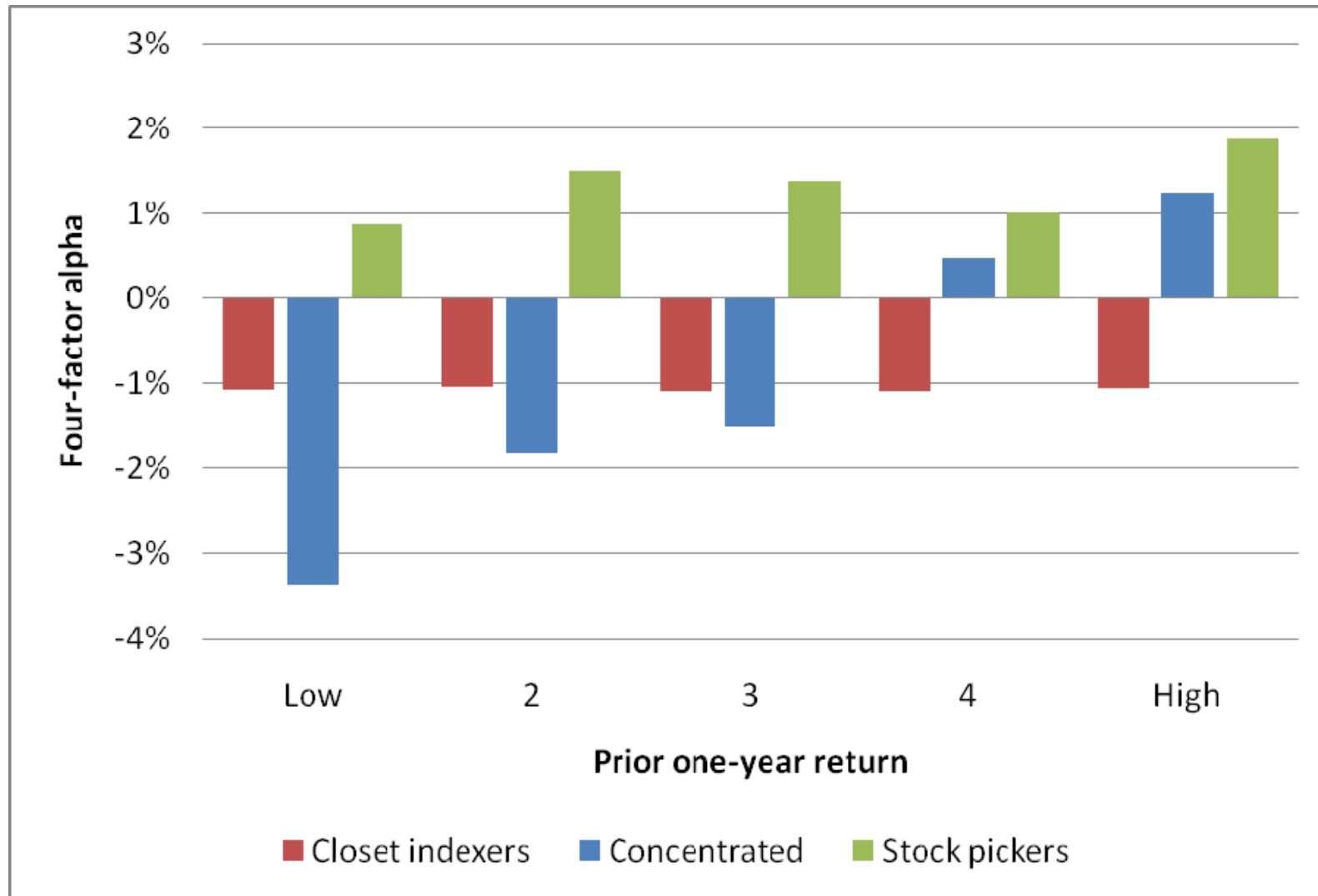
Greater Performance Persistence for Active Funds

Benchmark-Adjusted Net Return (After Expenses)



Momentum Eliminates Some of the Persistence

Four-Factor Alpha of Net Return (After Expenses)

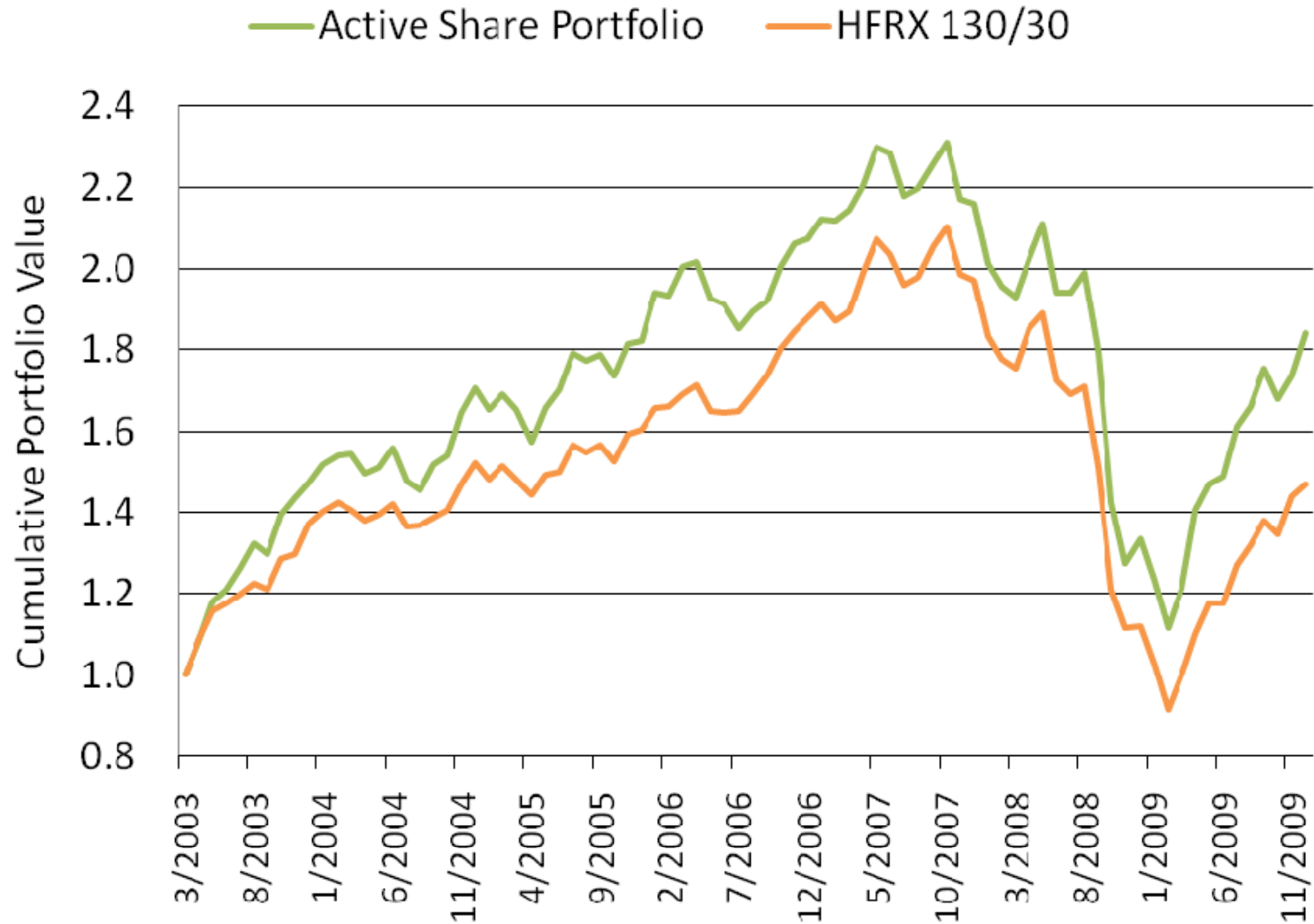


Active Share Predicts Returns within Fund Style

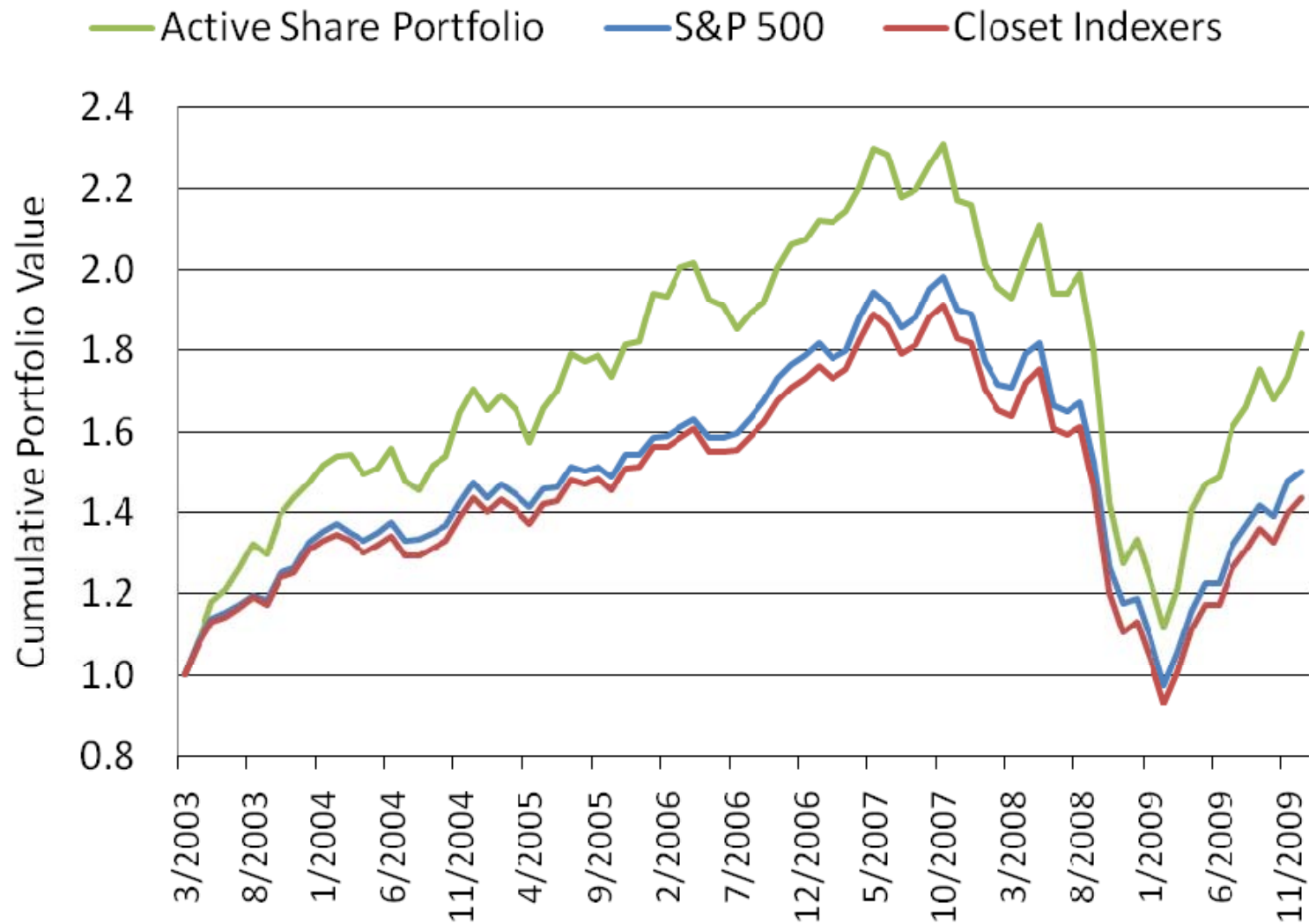
Regression of Benchmark-Adjusted Net Return on Fund Characteristics

	Benchmark-adjusted	
	(1)	(2)
Active Share	0.0739*** (2.76)	
Active Share * large cap		0.0867** (2.09)
Active Share * mid cap		0.1023* (1.84)
Active Share * small cap		0.1635** (2.03)
Tracking error	-0.0827 (-0.54)	-0.1019 (-0.69)
Expenses	-1.3423*** (-3.31)	-1.3281*** (-3.45)
Control variables	Yes	Yes
<i>N</i>	11,534	11,534
<i>R</i> ²	11.0%	11.3%

Performance Relative to Hedge Funds



Performance Relative to Closet Indexers



Identifying Stock Pickers' Markets

Regression of Stock Pickers' Net Return on Cross-Sectional Volatility

- Higher fund return on stock pickers if
 - Level of cross-sectional volatility is high
 - Cross-sectional volatility unexpectedly declines
- It is possible to time stock selection

$E_{t-1}[\text{CrossVol}(t)]$	0.1205*** (3.10)	0.1195*** (3.36)
$\varepsilon_{\text{CrossVol}(t)}$		-0.1637*** (-3.13)
N	159	159
R^2	12.4%	24.7%

Performance over the Crisis of 2008-2009

Group	Label	2008-2009	2009
5	Stock pickers	0.97 (0.42)	6.09 (1.84)
4	Concentrated	-2.59 (-0.56)	9.41 (2.11)
3	Factor bets	-1.72 (-0.63)	2.21 (0.82)
2	Moderately active	-0.32 (-0.24)	1.12 (0.54)
1	Closet indexers	-0.83 (-1.09)	-0.66 (-0.67)
	All	-0.51 (-0.32)	2.13 (1.01)
5 - 1	Difference	1.79 (0.89)	6.75 (2.28)

Performance Analysis: Sample Statistics in 2009

Label	Number of funds	Assets (\$M)	Active Share	Tracking error	Turnover	Expense ratio	Number of stocks
Stock pickers	217	492	96%	12.6%	78%	1.38%	66
Concentrated	54	534	97%	21.4%	104%	1.60%	54
Factor bets	215	2,012	76%	13.8%	106%	1.25%	133
Moderately active	651	870	81%	8.3%	98%	1.21%	110
Closet indexers	216	1,538	54%	4.7%	95%	1.01%	230
All	1,353	1,085	79%	9.8%	96%	1.23%	123

How Can a Practitioner Use Active Share?

- Use Active Share to identify better-performing funds
- Should we expect this to hold also in the future?
- Yes, for two reasons:
 - 1) Generating alpha requires deviating from benchmark
 - 2) No data mining in these results!
- Long-run outlook:
 - Any easy rule for earning positive alphas in the market is an anomaly which should not exist forever

How Can a Practitioner Use Active Share?

- Determine **how active** a fund is
 - Nice to know if you are paying for active management
- Determine the **type** of active management of a fund
 - Stock picking and factor bets
 - Better understand the risks you are exposed to
 - More objective comparison across funds

Where Do I Find Active Share Data?

- <http://www.petajisto.net/>
 - Historical data available up to 12/2006
 - Will be updated to 12/2009
 - In both SAS and ASCII format
 - Available for free
- Morningstar Direct
 - Subscription-based service
 - Have to define a benchmark first
- MutualDecision.com
 - Subscription-based service ranking mutual funds
 - Currently not available

Active Share in Practice

- From MutualDecision.com in December 2009:

We are pleased that for the ten months our four academic models were run top 25 funds as ranked by each model showed the following performance:

MODEL	RETURN	OVER/UNDER S&P 500
Return Gap	18.1%	+ 3.4%
Active Share	33.0%	+ 18.3%
Judging Fund Managers	21.2%	+ 6.5%
Forecasting Alphas	29.9%	+ 4.4%

Conclusions

- Active Share
 - Measures active positions as fraction of the portfolio
 - Use alone or together with tracking error
- Characterize active management
 - Hard to explain with other variables
 - Shift toward less active management in the 1990s
- Stock pickers with high Active Share outperform
 - Before fees: Managerial skill
 - Beat benchmarks by 2.1-2.6%
 - After fees: Can invest in some active funds
 - Choose active stock pickers (with good prior performance)