

FN452: Asset management and portfolio analysis

Active equity portfolio

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Active strategies

- The goal of active equity management is to beat a benchmark portfolio, net of transaction costs, on a risk-adjusted basis
- The job is not easy as average active funds collect total expense ratio around 1% to 2%
- In the long term, less than 15% of active funds can outperform their benchmark portfolios

Active strategies

Report 1: Percentage of U.S. Equity Funds Underperforming Their Benchmarks

FUND CATEGORY	COMPARISON INDEX	1-YEAR (%)	3-YEAR (%)	5-YEAR (%)	10-YEAR (%)	20-YEAR (%)
All Domestic Funds	S&P Composite 1500	57.09	67.01	72.80	83.22	86.01

Report 6: Percentage of International Equity Funds Underperforming Their Benchmarks

FUND CATEGORY	COMPARISON INDEX	1-YEAR (%)	3-YEAR (%)	5-YEAR (%)	10-YEAR (%)	20-YEAR (%)
Global Funds	S&P Global 1200	54.35	61.70	70.00	82.63	86.55
International Funds	S&P 700	54.62	63.30	74.37	79.51	91.25
International Small-Cap Funds	S&P Developed Ex-U.S. SmallCap	51.85	61.36	68.35	62.22	88.46
Emerging Markets Funds	S&P/IFCI Composite	52.00	61.03	70.51	71.43	92.21

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2020. Returns shown are annualized. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Active strategies

S&P 500 Sector Performance

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ENRS 34.4%	CONS -15.4%	INFT 61.7%	REAL 32.3%	UTIL 19.9%	FINL 28.8%	COND 43.1%	REAL 30.2%	COND 10.1%	ENRS 27.4%	INFT 38.8%	HLTH 6.5%	INFT 50.3%	INFT 43.9%
MATR 22.5%	HLTH -22.8%	MATR 48.6%	COND 27.7%	CONS 14.0%	COND 23.9%	HLTH 41.5%	UTIL 29.0%	HLTH 6.9%	TELS 23.5%	MATR 23.8%	UTIL 4.1%	TELS 32.7%	COND 33.3%
UTIL 19.4%	UTIL -29.0%	COND 41.3%	INDU 26.7%	HLTH 12.7%	REAL 19.7%	INDU 40.7%	HLTH 25.3%	CONS 6.6%	FINL 22.8%	COND 23.0%	COND 0.8%	FINL 32.1%	TELS 23.6%
INFT 16.3%	TELS -30.5%	REAL 27.1%	MATR 22.2%	REAL 11.4%	TELS 18.3%	FINL 35.6%	INFT 20.1%	INFT 5.9%	INDU 18.9%	FINL 22.2%	INFT -0.3%	S&P 31.5%	MATR 20.7%
CONS 14.2%	COND -33.5%	S&P 26.5%	ENRS 20.5%	TELS 6.3%	HLTH 17.9%	S&P 32.4%	CONS 16.0%	REAL 4.7%	MATR 16.7%	HLTH 22.1%	REAL -2.2%	INDU 29.4%	S&P 18.4%
INDU 12.0%	ENRS -34.9%	INDU 20.9%	TELS 19.0%	COND 6.1%	S&P 16.0%	INFT 28.4%	FINL 15.2%	TELS 3.4%	UTIL 16.3%	S&P 21.8%	S&P -4.4%	REAL 29.0%	HLTH 13.5%
TELS 11.9%	S&P -37.0%	HLTH 19.7%	S&P 15.1%	ENRS 4.7%	INDU 15.4%	CONS 26.1%	S&P 13.7%	S&P 1.4%	INFT 13.9%	INDU 21.0%	CONS -8.4%	COND 27.9%	INDU 11.1%
HLTH 7.2%	INDU -39.9%	FINL 17.2%	CONS 14.1%	INFT 2.4%	MATR 15.0%	MATR 25.6%	INDU 9.8%	FINL -1.5%	S&P 12.0%	CONS 13.5%	TELS -12.5%	CONS 27.6%	CONS 10.8%
S&P 5.5%	REAL -42.3%	CONS 14.9%	FINL 12.1%	S&P 2.1%	INFT 14.8%	ENRS 25.1%	COND 9.7%	INDU -2.5%	COND 6.0%	UTIL 12.1%	FINL -13.0%	UTIL 26.4%	UTIL 0.5%
COND -13.2%	INFT -43.1%	ENRS 13.8%	INFT 10.2%	INDU -0.6%	CONS 10.8%	UTIL 13.2%	MATR 6.9%	UTIL -4.8%	CONS 5.4%	REAL 10.9%	INDU -13.3%	MATR 24.6%	FINL -1.7%
REAL -17.9%	MATR -45.7%	UTIL 11.9%	UTIL 5.5%	MATR -9.6%	ENRS 4.6%	TELS 11.5%	TELS 3.0%	MATR -8.4%	REAL 3.4%	ENRS -1.0%	MATR -14.7%	HLTH 20.8%	REAL -2.2%
FINL -18.6%	FINL -55.3%	TELS 8.9%	HLTH 2.9%	FINL -17.1%	UTIL 1.3%	REAL 1.6%	ENRS -7.8%	ENRS -21.1%	HLTH -2.7%	TELS -1.3%	ENRS -18.1%	ENRS 11.8%	ENRS -33.7%

Source: <https://novelinvestor.com/sector-performance/>

Active portfolio strategies

- Fundamental analysis
 - Bottom up (e.g., stock undervaluation/overvaluation)
 - Top down (e.g., asset class rotation, sector rotation)
- Technical analysis
 - Continuation or price momentum
 - Contrarian or reversal strategy
- Factor investing and anomalies
 - Style factors (e.g. size, value, company quality)
 - Calendar effects (e.g., weekend, January)
 - Information effects (e.g., neglect)

Active strategies

Fundamental strategies

- Try to time equity market
- Shift funds among different equity sectors and industries (e.g. financial stocks, technology stocks, consumer cyclicals) or among investment styles (e.g. large cap, small cap, value, growth)
 - Large-cap growth stocks did very well in 1997-1999 and 2017-2020, whereas small-cap value outperformed in 2000-2007
- Attempt to find undervalued stocks

Fundamental analysis – Bottom-up strategies

- **Fundamental or discretionary** investing remains one of the prevailing philosophies of active management
- The strategies begin with **data at the individual asset and company level**, such as price momentum and profitability
- Analysts identify companies with strong or weak fundamentals through each company's industry, product lines, business plan, management abilities, and financial strength
- Then conduct economic and financial analysis to assess **the intrinsic value** of a company and compares that value with the current market price to determine which stocks are undervalued or undervalued

Fundamental analysis – Bottom-up strategies

Fundamental investors focus on the following parameters

- Business model and branding
- Competitive advantages
- Company management and corporate governance

Fundamental analysis – Bottom-up strategies

Value-based approaches – Aim to buy stocks that are trading at a significant discount to their estimated intrinsic value

- Relative value – P/E, P/CF, P/B, etc.
- High-quality value – Consistent earnings power, above-average ROE, financial strength, exemplary management, etc.
- Income investing – High dividend yields and positive dividend growth rates
- Deep value investing – Undervalued companies that are available at extremely low valuation relative to their assets
- Focus on **share price in anticipation of a market correction** and, possibly, improving company fundamentals

Fundamental analysis – Bottom-up strategies

EXHIBIT 2 Key Financial Ratios of Hang Seng Index (30 December 2016)

	Weight	Dividend Yield	Price-to-Earnings Ratio (P/E)	Price-to-Cash-Flow Ratio (P/CF)	Price-to-Book Ratio (P/B)	Total Debt to Common Equity (%)	Current Ratio
Hang Seng Index	100.0	3.5	12.2	6.1	1.1	128.4	1.3
Consumer discretionary	2.9	4.1	21.3	12.5	3.0	26.3	1.4
Consumer staples	1.6	2.6	16.8	14.3	3.3	62.1	1.4
Energy	7.0	2.6	39.5	3.7	0.9	38.5	1.0
Financials	47.5	4.3	10.1	5.0	1.1	199.8	1.1
Industrials	5.5	3.8	11.8	6.0	0.9	158.7	1.2
Information technology	11.4	0.6	32.7	19.9	8.2	60.2	1.0
Real estate	10.6	3.9	8.3	8.0	0.7	30.3	2.5
Telecommunication services	7.8	3.2	13.3	4.6	1.4	11.5	0.7
Utilities	5.6	3.7	14.2	10.8	1.7	47.0	1.3

Source: Bloomberg.

Source: *Portfolio management in practice, Volume 3 (Equity portfolio management)*

Fundamental analysis – Bottom-up strategies

Growth-based approaches – Focus on companies that are expected to grow faster than their industry or faster than the overall market, as measured by revenues, earnings, or cash flow

- High-quality companies with **rapid EPS growth**
- Compared to value-based investors, growth-based investors have a higher tolerance for above-average valuation multiples
- Focus on the current and future **economic “story” of a company**, with less regard for share valuation

Fundamental analysis – Bottom-up strategies

EXHIBIT 3 Financial Summary and Valuation for Tencent Holdings Limited

Market Data: 16 November 2016			2014	2015	2016E	2017E	2018E
Closing price	196.9	Revenue (RMB millions)	78,932	102,863	150,996	212,471	276,538
Price target	251.5	YOY (%)	30.60	30.32	46.79	40.71	30.15
HSCEI	9,380	Net income (RMB millions)	23,810	28,806	42,292	56,533	68,994
HSCCI	3,669	YOY (%)	53.49	21.85	46.76	32.87	22.04
52-Week high/low	132.10/220.8	EPS (RMB)	2.58	3.10	4.56	6.05	7.39
Market cap (USD millions)	240,311	Diluted EPS (RMB)	2.55	3.06	4.51	5.99	7.31
Market cap (HKD millions)	1,864,045	ROE (%)	29.09	23.84	26.11	26.18	24.71
Shares outstanding (millions)	9,467	Debt/Assets (%)	52.02	60.20	61.33	61.26	60.37
Exchange rate (RMB/HKD)	0.8857	Dividend yield (%)	0.20	0.20	0.28	0.38	0.46
		P/E	54.78	55.17	38.27	28.80	23.60
		P/B	22.31	19.35	13.39	9.99	7.54
		EV/EBITDA	40.79	35.88	28.06	20.09	15.39

Source: Portfolio management in practice, Volume 3 (Equity portfolio management)

Fundamental analysis – Bottom-up strategies

Fund Objective

The Baillie Gifford Long Term Global Growth Fund seeks to provide long-term capital appreciation.

Fund Facts

Institutional Class Ticker	BSGLX
Launch Date	June 10, 2014
Size	\$1,115.3m
Benchmark	MSCI ACWI Index
Current Number of Stocks	37
Active Share	91%*
Annual Turnover	19%
Style	Growth
Stocks (guideline range)	30-60

*Relative to MSCI ACWI Index. Source: Baillie Gifford & Co, MSCI.

LTGG Team

Name	Years' Experience
Mark Urquhart*	25
Tom Slater*	21

*Partner

Investment Proposition

Baillie Gifford Long Term Global Growth Fund is a purely stock-driven, unconstrained global equity fund focused on investing in exceptional growth companies from around the world. The approach is committed and expressly long term because we believe that investing in companies with the scope to grow to multiples of their current size over the next decade has the potential to transform the returns achieved for investors over time.

Top Ten Holdings

Holdings	Fund %
1 Moderna	6.20
2 Amazon	5.28
3 Tesla	4.71
4 NVIDIA	4.29
5 Meituan	4.26
6 ASML	4.17
7 Illumina	4.11
8 Tencent	3.71
9 Netflix	3.66
10 Dexcom	3.59

It should not be assumed that recommendations/transactions made in the future will be profitable or will equal performance of the securities mentioned. A full list of holdings is available on request. The composition of the Fund's holdings is subject to change. Percentages are based on securities at market value.

Fundamental analysis – Bottom-up strategies

Fund Characteristics

	Fund	MSCI ACWI Index
Market Cap (weighted average)	\$286.59bn	\$350.04bn
Price/Book	13.22	2.99
Price/Earnings (12 months forward)	34.56	17.13
Earnings Growth (5 year historic)	28.64%	9.79%
Return on Equity	27.34%	17.08%
Delivered Beta (trailing 3 years)	1.07	N/A
Standard Deviation (trailing 3 years)	23.82%	17.94%

Source: Baillie Gifford & Co, Factset, MSCI.
 Beta is in comparison to MSCI ACWI Index.

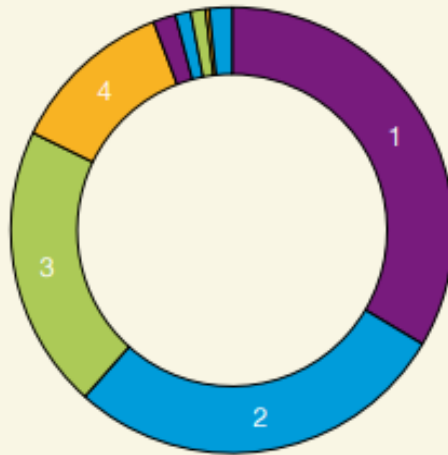
Fundamental analysis – Top-down strategies

The strategies use an investment process that begins at a top or macro level such as macroeconomic environment, demographic trends, and government policies

- Use futures contracts, ETFs, swaps, and custom baskets of individual stocks to capture macro dynamics and generate portfolio returns
- Often used with bottom-up strategies: Portfolio strategist set the target country and sector weights -> Portfolio managers then construct stock portfolios that are consistent with these preset weights
- Country and geographic allocation
- Sector and industry rotation
- Thematic investment strategies

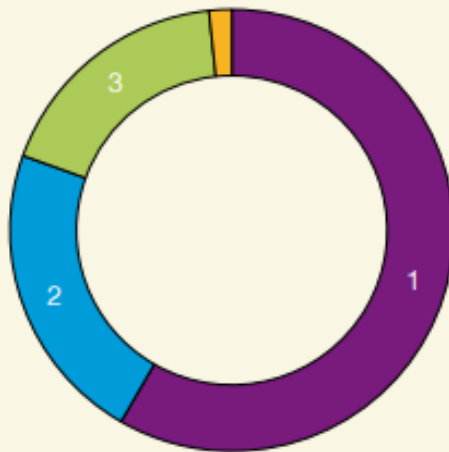
Fundamental analysis – Top-down strategies

Sector Analysis (%)



1	Consumer Discretionary	33.54
2	Information Technology	28.05
3	Health Care	20.61
4	Communication Services	12.03
5	Financials	1.65
6	Consumer Staples	1.13
7	Industrials	1.07
8	Real Estate	0.29
9	Cash	1.65

Geographic Analysis (%)



1	North America	58.32
2	Emerging Markets	22.17
3	Europe (ex UK)	17.87
4	Cash	1.65

Figures may not sum due to rounding. The composition of the Fund's holdings is subject to change. Percentages are based on securities at market value.

Fundamental analysis – Process

1. Define investment universe
2. Prescreen the investment universe to obtain a manageable set of securities
3. Understand the industry and business by performing
 - Industry and competitive analysis
 - Analysis of financial reports
4. Forecast company performance, most commonly in terms of cash flows or earnings
5. Convert forecasts to valuations
6. Construct a portfolio of these investments with desired risk profile
7. Rebalance the portfolio with buy and sell disciplines

Fundamental analysis – An example

1. S&P500
2. Exclude stocks with high P/E multiples and high debt-to-equity ratios
3. Understand the industry and business by performing
 - Industry and competitive analysis
 - Analysis of financial reports
4. Forecast company performance, most commonly in terms of cash flows or earnings
5. Convert forecasts to valuations
6. Take active exposures in energy, financial, and real estate sectors
7. Rebalance the portfolio with buy and sell disciplines

Technical strategies

- A **price momentum** strategy assumes that past stock price trends will continue in the same direction
- Investors underreact to the arrival of new information
- A **contrarian** investment strategy believe that past stock price trends will reverse themselves
- DeBondt and Thaler (1985) show that portfolios of stocks with worst market performance over the prior three years (losers) can outperform the winner portfolio

MTUM

iShares MSCI USA Momentum Factor ETF

Fact Sheet as of 09/30/2021

iShares®by **BLACKROCK®**

The iShares MSCI USA Momentum Factor ETF seeks to track the investment results of an index composed of U.S. large- and mid-capitalization stocks exhibiting relatively higher price momentum.

WHY MTUM?

- 1 Exposure to large- and mid-cap U.S. stocks exhibiting relatively higher price momentum
- 2 Index-based access to a specific factor which has historically driven a significant part of companies' risk and return¹
- 3 Use to help manage exposure and risk within a stock allocation

GROWTH OF 10,000 USD SINCE INCEPTION



The Growth of \$10,000 chart reflects a hypothetical \$10,000 investment and assumes reinvestment of dividends and capital gains. Fund expenses, including management fees and other expenses were deducted.

KEY FACTS

Fund Launch Date	04/16/2013
Expense Ratio	0.15%
Benchmark	MSCI USA Momentum SR Variant Index
30 Day SEC Yield	0.65%
Number of Holdings	125
Net Assets	\$15,338,627,593

Ticker	MTUM
CUSIP	46432F396
Exchange	Cboe BZX formerly known as BATS

TOP HOLDINGS (%)

TESLA INC	6.34
JPMORGAN CHASE & CO	4.69
BERKSHIRE HATHAWAY INC CLASS B	4.25
WALT DISNEY	4.21
BANK OF AMERICA CORP	4.21
PAYPAL HOLDINGS INC	3.54
MODERNA INC	3.13
WELLS FARGO	3.08
APPLIED MATERIAL INC	2.80
ALPHABET INC CLASS C	2.79
	<u>39.04</u>

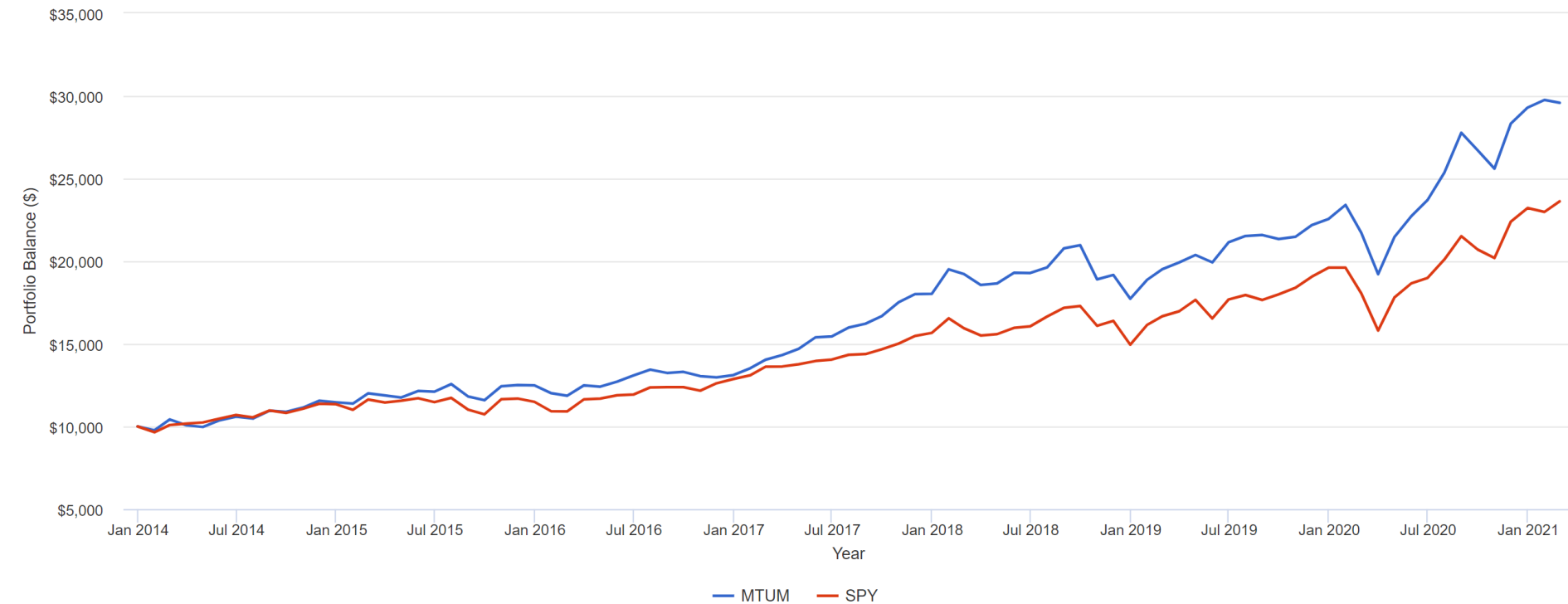
Holdings are subject to change.

Technical strategies

Portfolio Returns

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
MTUM	\$10,000	\$29,582 ⓘ	16.34% ⓘ	14.10%	37.50%	-1.66%	-17.90% ⓘ	1.09	1.86	0.91
SPY	\$10,000	\$23,618 ⓘ	12.74% ⓘ	13.97%	31.22%	-4.56%	-19.43% ⓘ	0.87	1.39	1.00

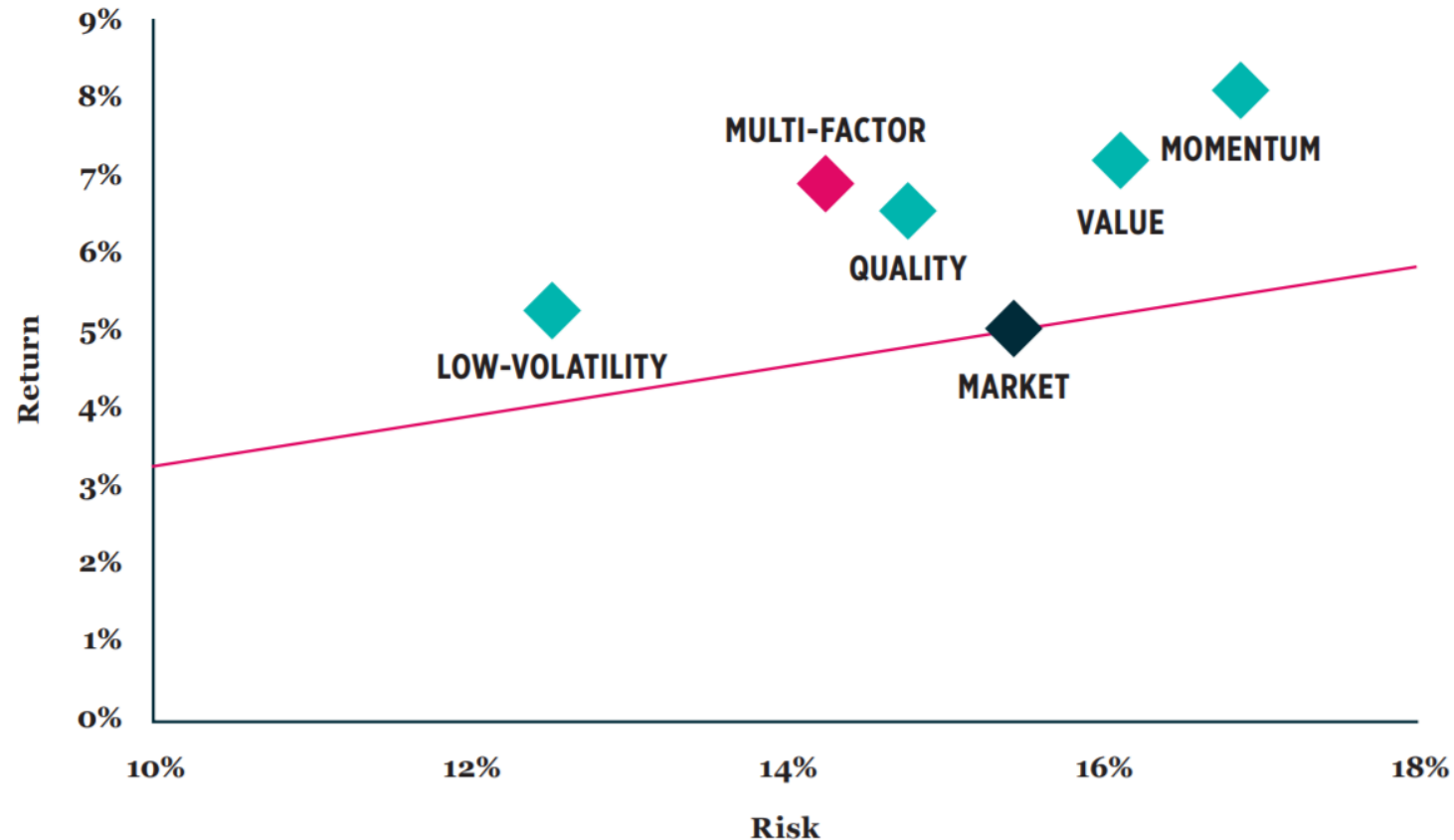
Portfolio Growth



Factor investing

- Factor-based investment strategies emphasize certain characteristics of a collection of stocks – such as **firm size, relative valuation, low return volatility, or company quality** – that are believed to produce higher risk-adjusted returns
- The risk premia associated with these factors allow the investor to earn superior returns with better diversification than holding a traditional passive index fund
- These factors also appear as risk factors in expanded versions of the CAPM to adjust for systematic risk exposures
- Therefore, factor investing is also called a **smart beta** approach

Factor investing



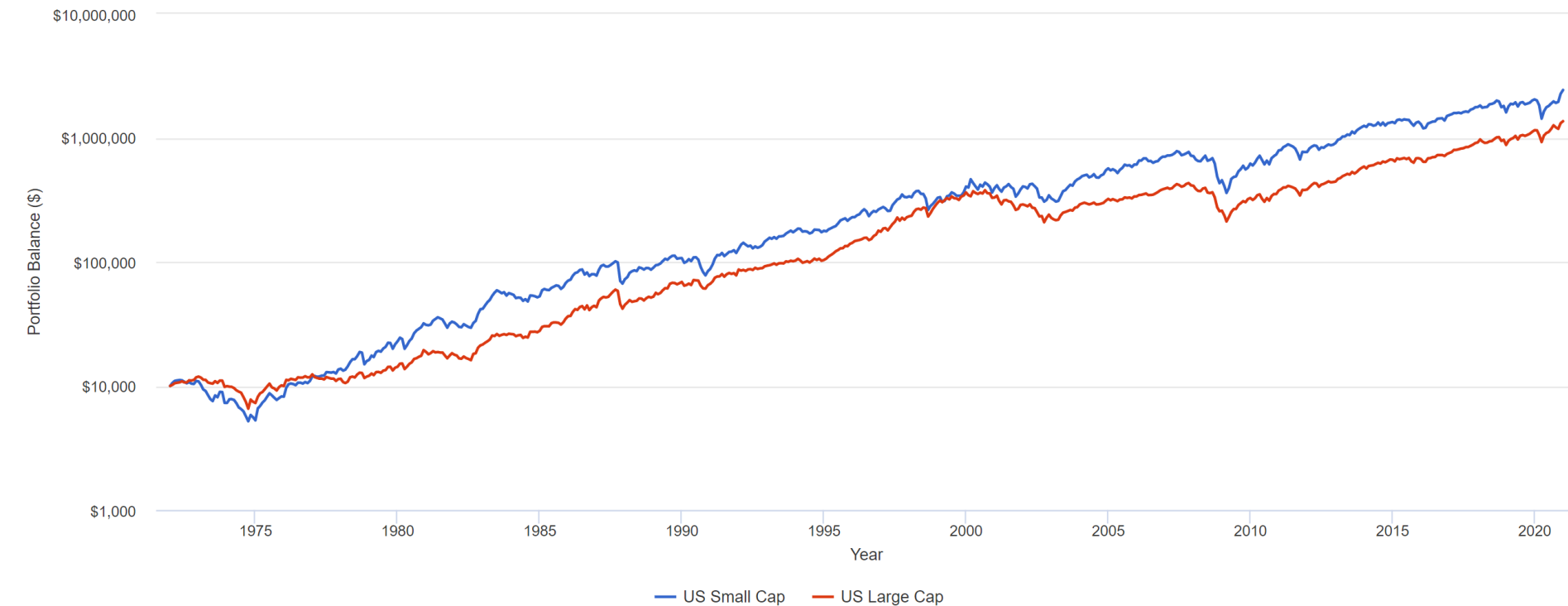
Source: Performance figures for generic US value-weighted factor portfolios from 1963:07 to 2014:12 from Blitz (2015), “Factor Investing Revisited”, Journal of Index Investing. Quality is defined as the equal weighted combination of the Profitability and Investment factor portfolios.

Factor investing

Portfolio Returns

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
US Small Cap	\$10,000	\$2,426,837 	11.86% 	19.69%	55.13%	-36.07%	-53.95% 	0.44	0.64	0.91
US Large Cap	\$10,000	\$1,360,199 	10.55% 	15.30%	37.45%	-37.02%	-50.97% 	0.43	0.64	0.99

Portfolio Growth



Factor investing

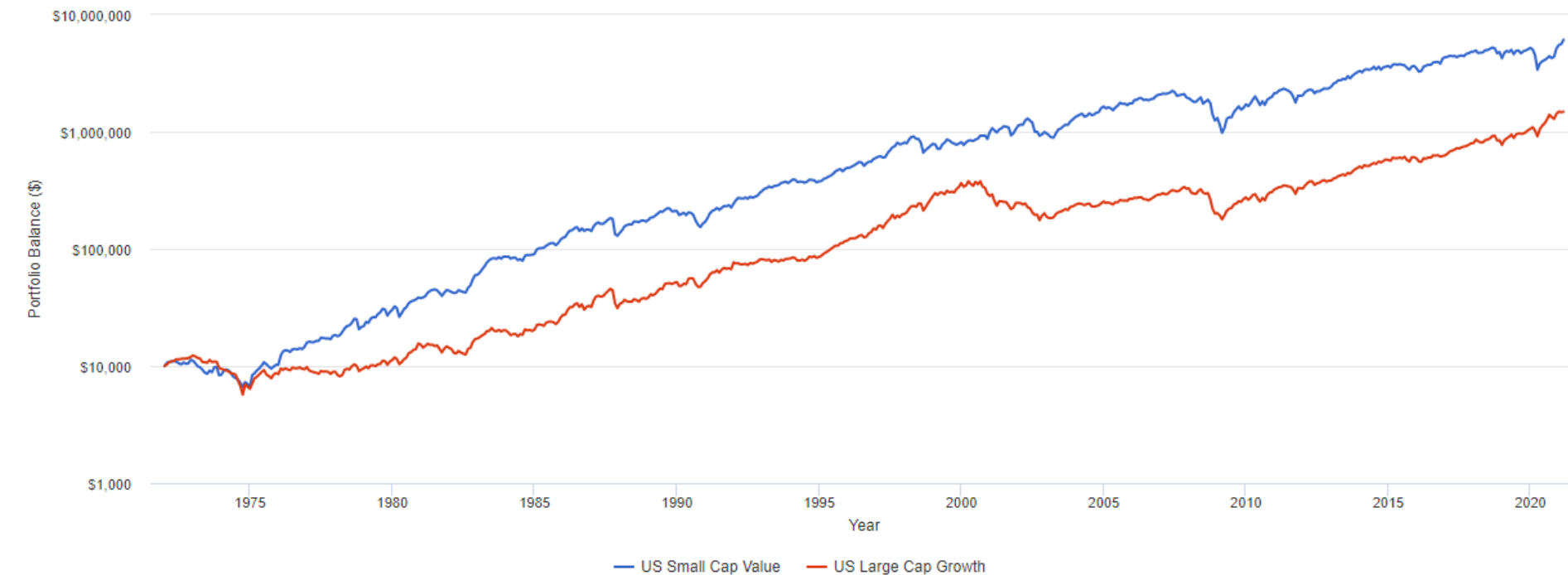
Roll Period	US Small Cap			US Large Cap		
	Average	High	Low	Average	High	Low
1 year	13.37%	97.53%	-44.66%	11.54%	58.83%	-43.32%
3 years	12.88%	37.65%	-19.16%	11.03%	32.80%	-16.14%
5 years	13.00%	34.06%	-6.30%	11.04%	28.95%	-6.73%
7 years	12.98%	29.58%	-1.18%	11.11%	22.44%	-3.94%
10 years	12.68%	26.24%	1.64%	11.08%	19.37%	-3.51%
15 years	12.22%	22.73%	4.54%	11.06%	19.30%	3.64%

Factor investing

Portfolio Returns

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	US Mkt Correlation
US Small Cap Value	\$10,000	\$6,112,092 ⓘ	13.94% ⓘ	18.35%	54.78%	-32.05%	-56.13% ⓘ	0.56	0.82	0.89
US Large Cap Growth	\$10,000	\$1,483,147 ⓘ	10.70% ⓘ	16.83%	44.61%	-38.32%	-53.60% ⓘ	0.42	0.62	0.96

Portfolio Growth



Sources of active returns

- Strategically adjusting the active weights of the stocks to create long-term exposures to **rewarded factors**
- Tactically adjusting the active weights of the stocks using fund manager's skills/expertise in identifying mispricing in stocks (**stock selection**), sectors, rewarded risks (**factor timing**), to **generate alpha**

Sources of active returns – Rewarded factors

EXHIBIT 2 Risk Factor Exposure (February 1990–December 2016)

	Russell 1000 Index	Russell 1000 Value Index	Value Fund	Factor Performance US Market
Monthly performance in excess of the risk-free rate	0.64%	0.66%	0.40%	—
	β to specified factor:			
Market*	0.99	0.92	0.90	0.64%
Size	-0.16	-0.23	0.13	0.16%
Value	0.02	0.41	0.59	0.18%
Momentum	-0.01	0.13	0.09	0.61%
“Alpha” (monthly)	0.05%	-0.05%	- 0.35%	—
R^2	0.99	0.95	0.74	

* As mentioned in footnote 3, the Market factor is built from a much larger universe of securities than are traditional benchmarks, such as the Russell 1000. Therefore, we should not expect the β of indexes to the Market factor to be necessarily equal to one.

Note: All data are measured in US dollars.

Sources: Factor data for the United States are from AQR Capital Management, market data are from Bloomberg, and calculations are from the authors.

Source: Portfolio management in practice, Volume 3 (Equity portfolio management)

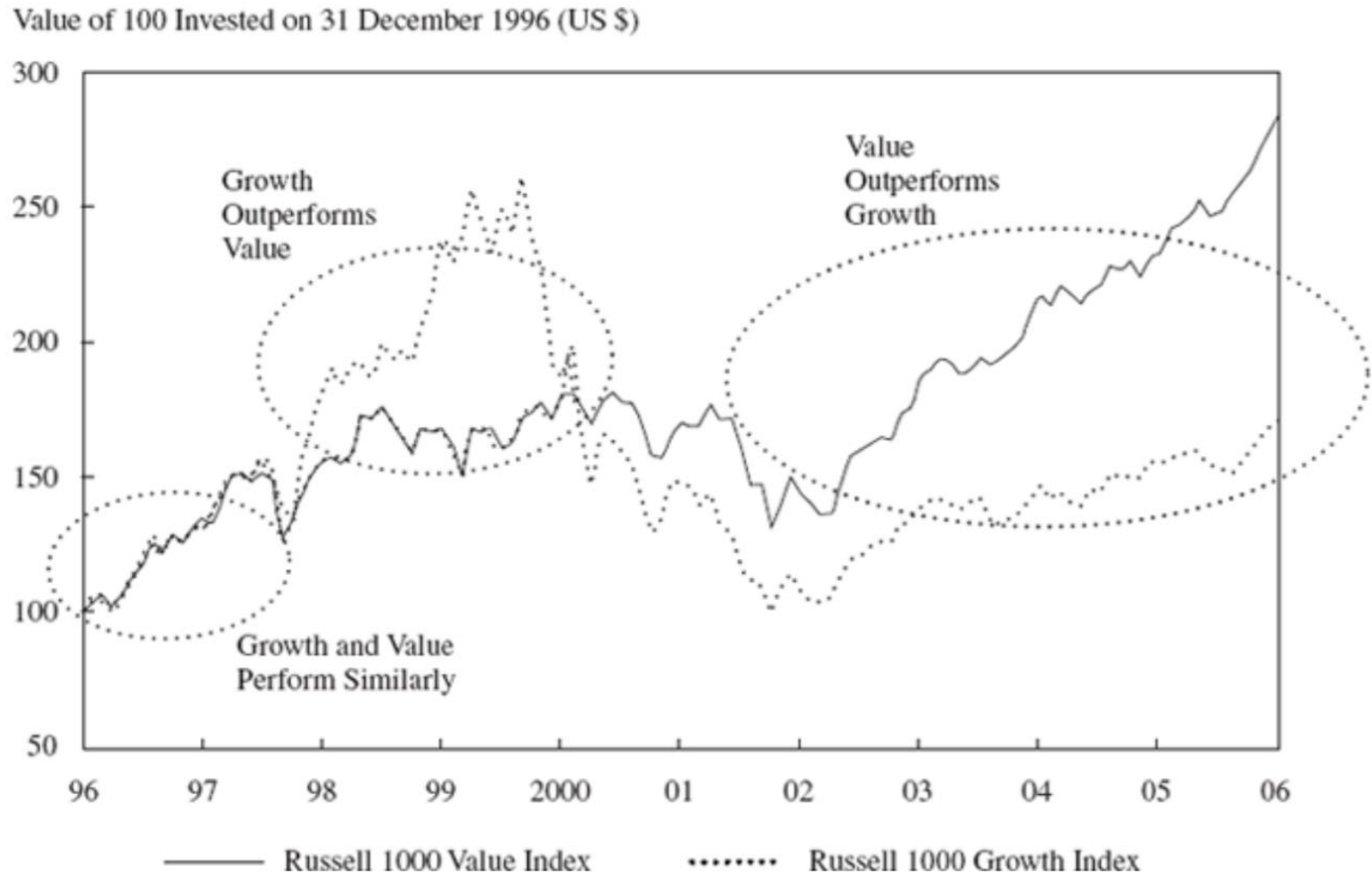
Sources of active returns – Rewarded factors

EXHIBIT 3 Sources of Performance (February 1990–December 2016)

Source of Performance	Russell 1000	Russell 1000 Value	Value Fund
Market	0.63%	0.59%	0.57%
Size	-0.03%	-0.04%	0.02%
Value	0.00%	0.08%	0.11%
Momentum	-0.01%	0.08%	0.05%
Alpha	0.05%	-0.05%	-0.35%
Total monthly performance	0.64%	0.66%	0.40%

Sources of active returns - Alpha

EXHIBIT 4 Cumulative Value—Russell 1000 Growth and Russell 1000 Value



Source: Langlois and Lussier (2017, p. 44).

Measuring active management – Active share

- Active Share is the percentage of the fund's portfolio that differs from the fund's benchmark index

$$\text{Active share} = \frac{1}{2} \sum_{i=1}^N |w_i - w_{Bi}|$$

- If a portfolio has an active share of 0.50, we can conclude that 50% of the allocation positions of this portfolio are identical to that of the benchmark and 50% are not
- For an all-equity mutual fund that has no leveraged or short positions, the Active Share of the fund will always be between 0% and 100%
- Active Share is a reasonable proxy for **stock selection**

Measuring active management – Active risk

- We can calculate active risk or tracking error (the risk of performing differently from the benchmark) as

$$\text{var}[R_p - R_b] = \text{var} \left[\sum_{j=1}^K (A_j - B_j) f_j \right] + \text{var} \left[\sum_{i=1}^N (w_i - w_{Bi}) e_i \right]$$

- Tracking error measures the volatility of the fund that is not explained by movements in the fund's benchmark index
- Tracking error is a proxy for **systematic factor risk** (including region and sector bets)

Measuring active management

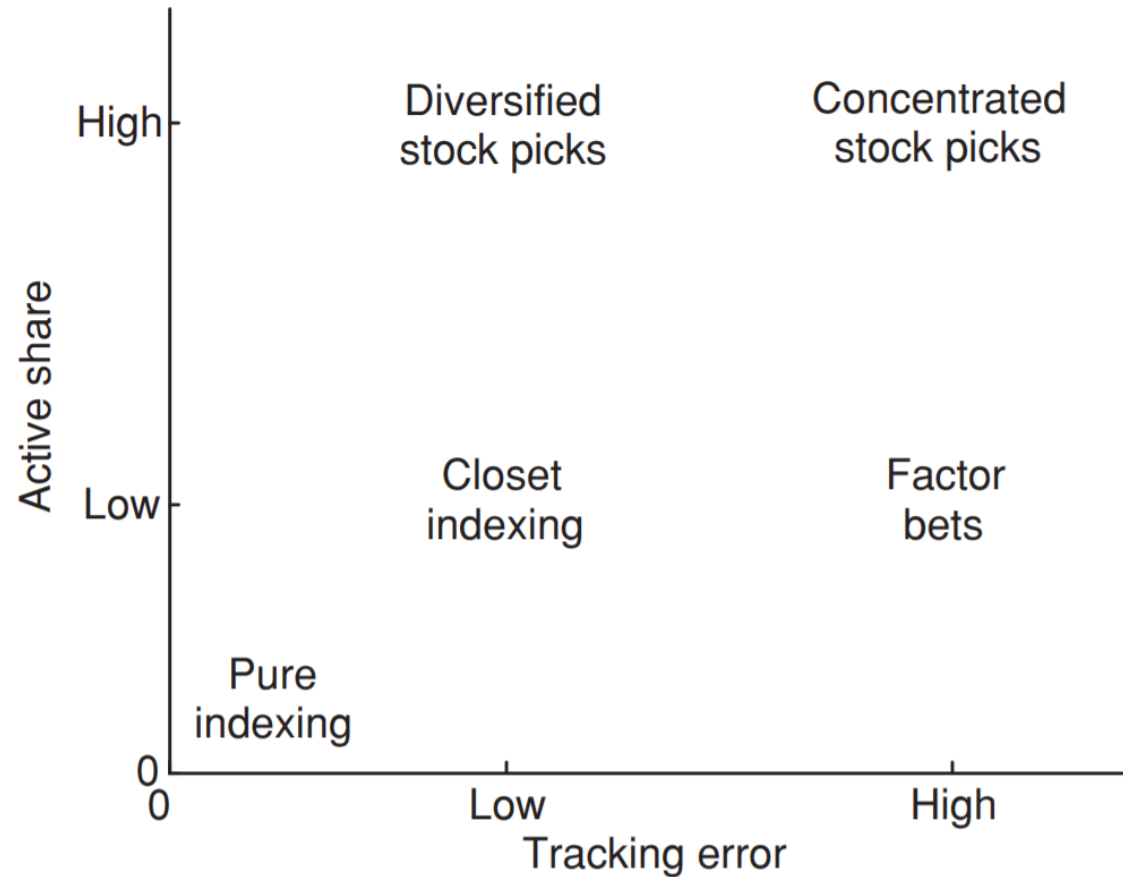


Figure 1

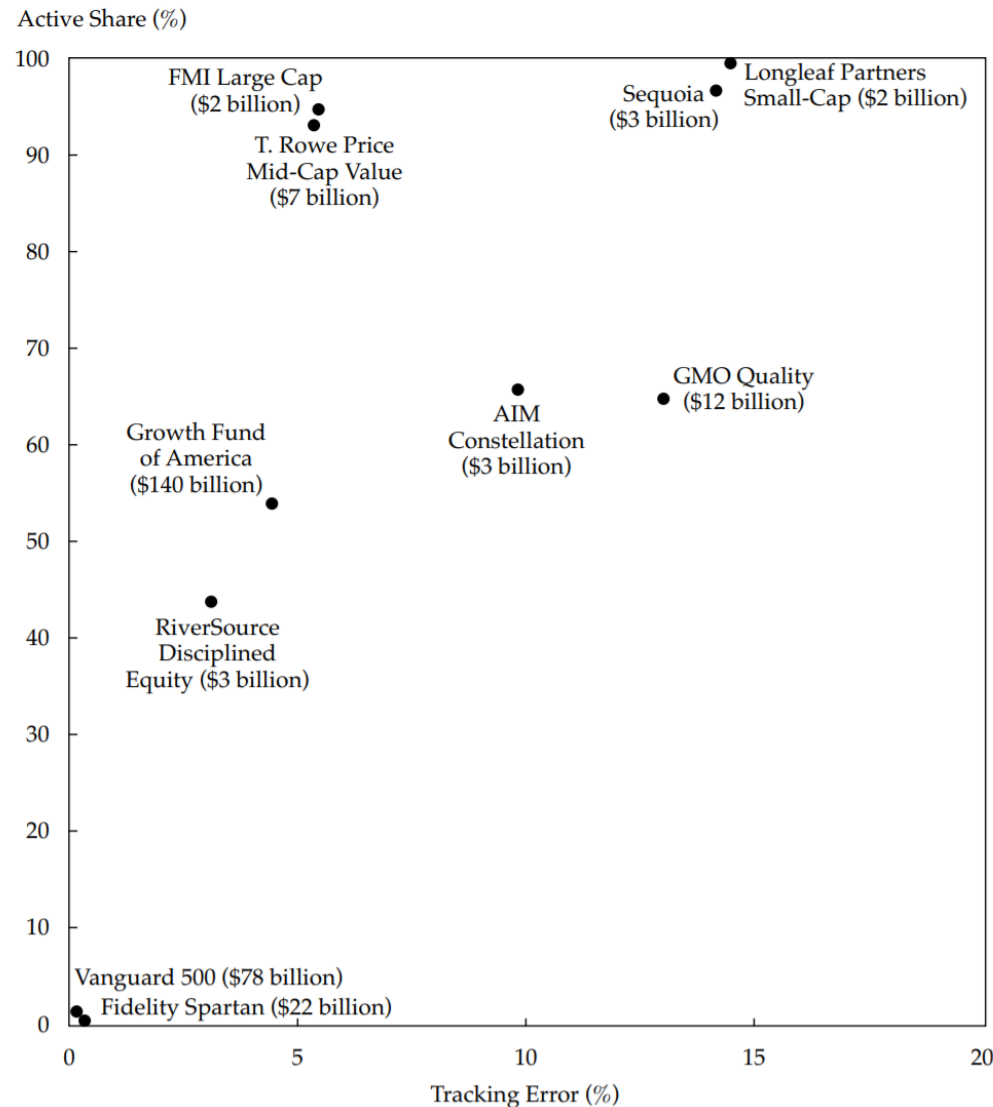
Different types of active and passive management

Active Share represents the fraction of portfolio holdings that differ from the benchmark index, thus emphasizing stock selection. Tracking error is the volatility of fund return in excess of the benchmark, so it emphasizes bets on systematic risk.

Source: Cremers and Petajisto (2009)

Measuring active management

Figure 2. Examples of Funds in Each Category, 2009



Source: Petajisto (2013)

Active management – An example

- To maximize utility based on active return and active risk

$$\sum_{i=1}^N w_i \alpha_i - \frac{1}{2} \gamma \sum_{i=1}^N (w_i - w_{Bi})^2$$

- Randomly assign weight in the portfolio to seed the optimization
- Set following constraints
 - Market cap within +/- 10% of the index
 - P/B within +/- 10% of the index
 - Sector allocation not exceeding 10% of the index
 - Summation of weight = 100%
 - Non-negative weights or minimum/maximum weights
- Solve for weights

Active management – An example

	A	B	C	D	E	F	G	H	I	J	K	L
1	Objective		Maximize	0.0076	=SUMPRODUCT(G13:G112,J13:J112)-1/2*D2*SUM(I13:I112)							
2		Risk aversion factor		4								
3		Constraints	Target	Range	Wtd avg	Active						
4		Market-cap	312,183	10%	319,185	2.24%	=E4/C4-1	Active share	50.0%	=SUM(ABS(G13:G617))/2		
5		P/B	3.67	10%	3.31	-10.00%	=E5/C5-1	Alpha	1.38	=SUMPRODUCT(F13:F112:I13:I112)		
6		Cyclicals	56.59%	10%	59.76%	5.61%	=E6/C6-1	No. of holdings	100	=SUM(IF(F13:F112>0,1,0))		
7		Financials	28.98%	10%	29.34%	1.24%	=E7/C7-1					
8		NonCyclicals	14.43%	10%	10.90%	-24.49%	=E8/C8-1					
9		Weight	100.00%		100.00%							
10												
11		Columns B to F are from Sheet "Sort"										
12	No.	Ticker	Weight	Market cap	P/B	Broad sector	Fund weight	Active weight	Square of active weight	Alpha		
13	1	PTT	7.65%	1,213,927	1.38	Cyclicals	7.53%	-0.12%	0.0000	-1.00%		
14	2	AOT	5.60%	889,284	6.25	Cyclicals	6.27%	0.66%	0.0000	1.00%		
15	3	DELTA	3.82%	606,227	16.12	Cyclicals	4.30%	0.48%	0.0000	-2.00%		
16	4	ADVANC	3.30%	523,345	6.93	Cyclicals	4.25%	0.95%	0.0001	2.00%		
17	5	CPALL	3.30%	523,265	6.81	Noncyclicals	2.99%	-0.30%	0.0000	-3.00%		
18	6	SCC	2.86%	453,600	1.41	Cyclicals	3.74%	0.88%	0.0001	3.00%		
19	7	GULF	2.53%	401,860	6.28	Cyclicals	1.95%	-0.59%	0.0000	-4.00%		
20	8	PTTEP	2.46%	390,051	1.12	Cyclicals	3.57%	1.12%	0.0001	4.00%		
21	9	BDMS	2.08%	330,554	3.76	Noncyclicals	1.10%	-0.98%	0.0001	-5.00%		
22	10	SCB	1.87%	297,114	0.72	Financials	3.22%	1.34%	0.0002	5.00%		

Active management – An example

Solver Parameters

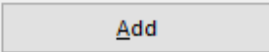
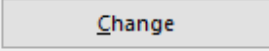
Set Objective: 

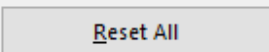
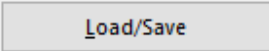
To: ☒ Max ☐ Min ☐ Value Of:

By Changing Variable Cells: 

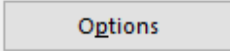
Subject to the Constraints:

$$\begin{aligned} &SE\$4 \leq SC\$4*(1+SD\$4) \\ &SE\$4 \geq SC\$4*(1-SD\$4) \\ &SE\$5 \leq SC\$5*(1+SD\$5) \\ &SE\$5 \geq SC\$5*(1-SD\$5) \\ &SE\$6 \leq SC\$6*(1+SD\$6) \\ &SE\$7 \leq SC\$7*(1+SD\$7) \\ &SE\$8 \leq SC\$8*(1+SD\$8) \\ &SE\$9 = SC\$9 \end{aligned}$$

☒ Make Unconstrained Variables Non-Negative

Select a Solving Method:  

Solving Method

Select the GRG Nonlinear engine for Solver Problems that are smooth nonlinear. Select the LP Simplex engine for linear Solver Problems, and select the Evolutionary engine for Solver problems that are non-smooth.

