

STYLE ANALYSIS

WHAT WILL YOU LEARN?

- ▶ Style analysis
 - ▶ Decompose portfolio return to 'return due to style' and 'return due to selection'
 - ▶ 'return due to selection' = difference between fund return and that of a passive mix of similar styles.

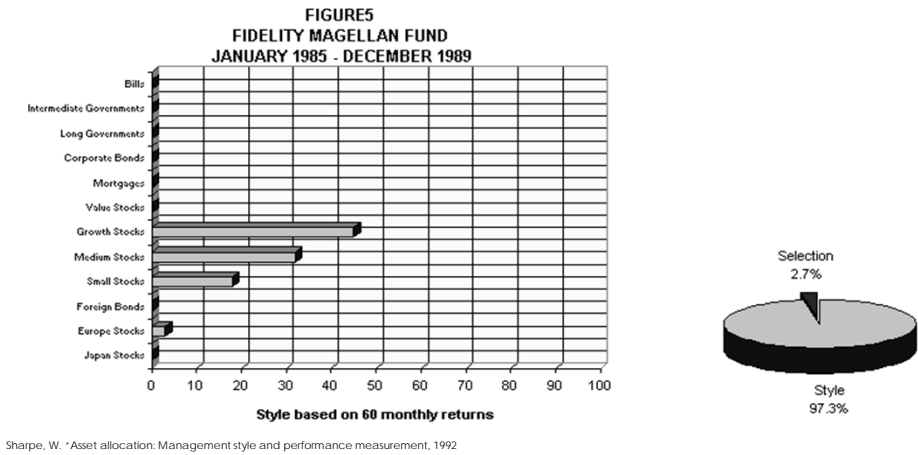
STYLE ANALYSIS

- ▶ Style analysis is a powerful and sophisticated technique used to measure the performance of a portfolio manager.
- ▶ Describe performance by analyzing how the portfolio return act – rather than what the portfolio includes.

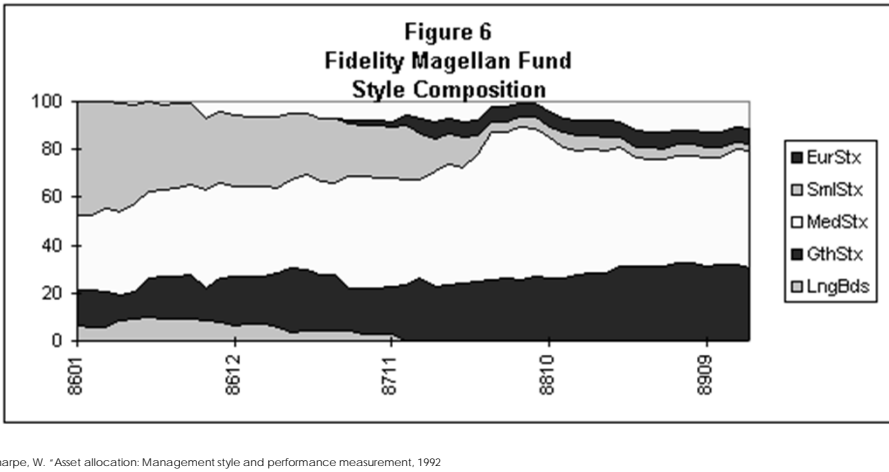
EQUITY INVESTMENT STYLES

LARGE-CAP VALUE	LARGE-CAP MARKET- ORIENTED	LARGE-CAP GROWTH
MID-CAP VALUE	MID-CAP MARKET- ORIENTED	MID-CAP GROWTH
SMALL-CAP VALUE	SMALL-CAP MARKET- ORIENTED	SMALL-CAP GROWTH

EXAMPLE: FIDELITY MAGELLAN FUND



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STYLE ANALYSIS

- ▶ Style analysis can be used:
 - ▶ To determine whether a fund's strategy has deviated from its stated objective.
 - ▶ To measure performance versus the 'true' benchmark rather than an arbitrary benchmark such as the S&P 500.
 - ▶ Understand the true exposures of a portfolio and how it will best fit with an investor's overall portfolio allocation.

SUMMARY

- ▶ Style analysis is a statistical method of decomposing the portfolio's return into a set of style-specific benchmarks.

STYLE ANALYSIS: HOW DOES IT WORK?

WHAT WILL YOU LEARN?

- ▶ Style analysis
 - ▶ Decompose portfolio return to 'return due to style' and 'return due to selection'
 - ▶ How do we do that?

STYLE ANALYSIS

- ▶ Style analysis is a statistical method of decomposing the portfolio's return into a set of style-specific benchmarks.

STYLE BENCHMARKS

- ▶ What are the appropriate benchmarks?
 - ▶ mutually exclusive
 - ▶ exhaustive and,
 - ▶ have returns that “differ”.
- ▶ Often the “Russell Corners”:
 - ▶ Russell 1000 Growth
 - ▶ Russell 1000 Value
 - ▶ Russell 2000 Growth
 - ▶ Russell 2000 Value

- ▶ Typical benchmarks
 - ▶ Treasury bill index
 - ▶ Government bond index
 - ▶ Corporate bond index
 - ▶ Foreign bond index
 - ▶ Large-cap value index
 - ▶ Large-cap growth index
 - ▶ Small-cap value index
 - ▶ Small-cap growth index
 - ▶ Foreign equity index
- ▶ Depending on the fund's mandate, may also include:
 - ▶ Strategies taking advantage of “anomalies”
 - ▶ Dynamic strategies with option-like payoffs

STYLE ANALYSIS

- ▶ Solve a quadratic optimization problem using the past returns on the portfolio and the relevant indices to find the ‘style’ of the portfolio

STYLE ANALYSIS

STYLE ANALYSIS

	Excess returns					Style Portfolios				
	LMVTX	PCBAX	FCNTX	USAWX	SmallCap	MidCap	LargeCap	Growth	MidBM	Value
199501	0.53%	-0.59%	-2.04%	-5.78%	0.77%	-0.55%	2.41%	-0.83%	1.45%	2.16%
199502	3.24%	2.61%	3.63%	-0.32%	2.86%	4.62%	3.51%	3.63%	3.58%	3.63%
199503	1.00%	1.88%	3.19%	2.07%	1.89%	1.97%	2.25%	0.28%	2.50%	2.5900%
199504	4.11%	2.03%	4.07%	3.18%	2.15%	1.50%	2.27%	0.62%	1.55%	2.62%
199505	4.38%	2.19%	1.87%	2.48%	1.53%	1.21%	3.43%	0.11%	2.73%	2.88%
199506	3.84%	1.71%	5.87%	1.46%	6.02%	4.40%	1.98%	4.16%	3.77%	1.61%
199507	4.22%	3.16%	7.21%	4.55%	5.75%	5.83%	3.16%	9.09%	3.90%	3.71%
199508	1.29%	0.86%	0.85%	-1.84%	2.78%	1.06%	0.28%	1.18%	-0.17%	0.90%
199509	3.54%	0.81%	1.40%	0.67%	1.76%	1.56%	3.91%	1.97%	4.19%	2.71%
199510	-3.52%	-3.45%	-2.29%	-2.79%	-5.80%	-3.11%	-0.89%	-6.21%	-0.58%	-2.15%
199511	4.28%	2.95%	2.21%	1.24%	2.35%	4.35%	4.01%	1.75%	3.50%	4.62%
199512	2.52%	1.17%	0.29%	2.20%	1.79%	1.11%	0.99%	1.45%	-0.08%	2.01%
199601	4.33%	1.25%	1.83%	2.40%	0.16%	-0.42%	2.96%	-1.09%	2.33%	2.40%
199602	0.52%	1.41%	0.20%	1.37%	2.83%	2.91%	0.98%	2.51%	1.84%	1.37%
199603	0.96%	1.09%	2.39%	1.83%	2.05%	2.23%	0.40%	1.89%	-0.02%	1.29%
199604	0.69%	2.76%	2.63%	3.75%	7.13%	3.88%	1.06%	1.91%	2.90%	1.14%
199605	2.86%	1.09%	0.42%	0.49%	6.10%	1.97%	2.06%	-1.47%	3.59%	0.88%
199606	-1.23%	-1.09%	-1.18%	-0.40%	-4.51%	-3.45%	-0.12%	-1.26%	-0.99%	-0.82%
199607	-2.06%	-3.65%	-5.10%	-8.58%	-10.49%	-8.26%	-5.16%	-9.86%	-6.72%	-4.46%
199608	3.95%	2.76%	3.40%	2.63%	4.41%	5.74%	2.07%	4.72%	2.04%	3.54%
199609	5.55%	3.53%	3.67%	2.10%	2.99%	4.02%	5.33%	4.56%	6.25%	4.00%
199610	4.77%	1.13%	2.79%	-0.75%	-2.26%	-1.68%	1.68%	-3.71%	-0.23%	2.72%
199611	9.90%	3.77%	5.40%	5.17%	2.24%	4.08%	7.09%	1.26%	6.42%	7.12%

STYLE ANALYSIS PROCEDURE

1. Start with arbitrary coefficients and intercept.

Intercept	0.00%
B1	0.17
B2	0.17
B3	0.17
B4	0.17
B5	0.17
B6	0.17
Sum of coefficients = 1	1.00
Sum of Squared Residuals	
Average Residual	
Average Return	
Total Sum of Squares	
R-squared	

STYLE ANALYSIS PROCEDURE

1. Start with arbitrary coefficients and intercept.
2. Compute residuals.

	Residuals
	LMVTX
199501	-0.3763%
199502	-0.3963%
199503	-0.9175%
199504	2.3272%
199505	2.4002%
199506	0.1804%
199507	-1.0221%
199508	0.2862%
199509	0.8546%
199510	-0.3917%
199511	0.8500%
199512	1.3124%
199601	3.2771%

STYLE ANALYSIS PROCEDURE

1. Start with arbitrary coefficients and intercept.
2. Compute residuals.
3. Compute squared residuals and sum them.
4. Minimize the sum of squared residuals by changing the intercept and coefficients (using Solver).

	Residuals	Sqd Resids		Intercept	0.00%
	LMVTX	LMVTX		B1	0.17
199501	-0.3763%	0.0014%		B2	0.17
199502	-0.3963%	0.0016%		B3	0.17
199503	-0.9175%	0.0084%		B4	0.17
199504	2.3272%	0.0542%		B5	0.17
199505	2.4002%	0.0576%		B6	0.17
199506	0.1804%	0.0003%			
199507	-1.0221%	0.0104%			
199508	0.2862%	0.0008%			
199509	0.8546%	0.0073%			
199510	-0.3917%	0.0015%			
			Sum of coefficients = 1		1.00
			Sum of Squared Residuals		16.6% <-- Minimize this!

STYLE ANALYSIS PROCEDURE

1. Start with arbitrary coefficients and intercept.
2. Compute residuals.
3. Compute squared residuals and sum them.
4. Minimize the sum of squared residuals by changing the intercept and coefficients (using Solver).
5. Calculate R-squared statistic.
 - The R-squared measures to what degree the style benchmarks explain the variation in portfolio returns.

SUMMARY

- Style analysis is a statistical method of decomposing the portfolio's return into a set of style-specific benchmarks.