



# New Paradigms in Stock Market Indexing

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# Fundamental Indexing™

- Indices that are weighted by certain fundamental factors such as sales, earnings, dividends or book values, rather than market capitalization
- Capitalization-weighted indexing has come under fire for overweighting (temporarily) overvalued stocks and underweighting undervalued ones in a portfolio
- Fundamental Indices claim to achieve superior risk-adjusted returns by avoiding such deficiencies of capitalization weighting



# Fundamental Indexing Performance

## Return Characteristic of US Indices 2005-2007

	<b>RAFI 1000</b>	<b>S&amp;P 500</b>	<b>Russell 1000</b>
Average Annual Return	9.45%	8.46%	8.91%
Monthly Standard Dev.	2.29%	2.30%	2.33%
Sharpe Ratio	2.05	1.88	2.05

Source: Bloomberg

## Return Characteristic of World Indices 2005-2007

	<b>RAFI Developed World ex US</b>	<b>MSCI EAFE</b>
Average Annual Return	19.60%	15.68%
Monthly Standard Dev.	2.80%	2.89%
Sharpe Ratio	5.52	3.99

Source: Bloomberg



# Our View on Fundamental Indexing

- Fundamental Indexing should be considered active management rather than passive indexing
- FI relies on two factor tilts that researchers have understood for years – Size and Value risk factors
- Based on regressions using the Fama-French three factor model, Fundamental Indexing produces an alpha of zero
- It is possible to replicate FI returns with a variety of ETFs that employ similar factor tilts
- Given this view, we offer perspectives on how investors should look at a “value” oriented investment strategies



## Rationale for Fundamental Indexing

- The putative rationale for FI has been stated by Arnott, Hsu, and Moore (2005) as well as by Treynor (2005) and Siegel (2006)
- An index-based on price will necessarily overweight “overvalued” stocks and underweight the “undervalued” ones
- By weighting stocks by “Main Street” measures of size that are not determined by the market, proponents of FI claim that they can avoid this problem



## When Cap-weighting gets it Wrong

- Fair Value of Stock A & B = \$100
- Market Value of Stock A = \$130
- Market Value of Stock B = \$90
- Stock A is over valued, and Stock B is under valued
- Cap-weighting will give more weight to Stock A, and less weight to Stock B



## When Fundamental Weighting gets it Wrong

- Stocks A & B have equal “Fundamental” measures of size
- Market & True Value of Stock A = \$130 (high growth expectation)
- Market & True Value of Stock B = \$90 (financial distress)
- Fundamental weighting will underweight stock A and not fully capitalize on the future growth of the company (i.e. Google)
- Fundamental weighting will overweight stock B and may suffer from further price depreciation (i.e. Financials)



## Factor Tilts in Fundamental Indexing

- To the extent that earnings and book values are some of the factors used to weight stocks in the portfolio, FI will systematically overweight “value” stocks and underweight “growth” stocks.
- To the extent that FI attempts to underweight stocks with (temporarily) high market capitalizations, there will be a tendency for an FI portfolio to contain smaller-capitalization stocks compared with a cap-weighted index.



## Academic Literature

- DeBondt and Thaler (1987) and Keim (1988) and Fama and French (1992): Stocks with Low P/BV produce above average returns. Similar results for stocks with low P/E
- Basu (1983): Stocks with smaller market capitalization produce above average returns
- Fama and French (1993): Interpret these results as risk factors of “Size” and “Value”

$$\text{Return} = f(\text{CAPM } \beta, \text{ High } \frac{M}{B} - \text{Low } \frac{M}{B}, \text{ S-B})$$



# Regression Analysis: Fama-French Model

## Regression Results of FI Returns Vs Fama French Risk Factors

Period	R <sup>2</sup>	T-Value Beta	T-Value M/B Risk Factor	T-Value Size Risk Factor	$\alpha$	(t-value)
Jan 1962 – December 2007	0.96	109.79	24.72	-5.95	0	-0.04
Jan 1979 – December 2007	0.94	74.2	17.2	-6.12	0	0.75
July 1996 – December 2007	0.88	31.66	9.76	-3.48	0	0.63

Regression results from explaining the excess returns on the fundamental index against the Fama-French factors of Beta (excess returns on the S&P 500), M/B Risk Factor (the value premium), and Size Risk Factor (the small-cap premium) are presented in three sample periods starting in (1) January 1962, (2) January 1979, and (3) January 1996 and ending in December 2007. The y-intercept of the regression is presented as  $\alpha$  below.



## ETFs with Size and Value Tilts

- If FI is simply making a bet on the size and value effect, there exist a number of other options readily available to any investor to gain the same risk/return exposure.

Index	ETF Ticker
<b>RAFI 1000 Index</b>	<b>PRF</b>
Equity Weighted S&P 500	RSP
S&P 500	SPY
S&P 500 Growth	IVE
S&P 500 Value	IVV
S&P Midcap 400	IJH
S&P Midcap 400 Growth	IJK
S&P Midcap 400 Value	IJJ
Russell 1000	IWB
Russell 1000 Growth	IWF
Russell 1000 Value	IWD
Russell 2000	IWM
Russell 2000 Growth	IWO
Russell 2000 Value	IWN



# Hypothetical Portfolio Backtest

Comparative Performance: January 2000 through December 2007

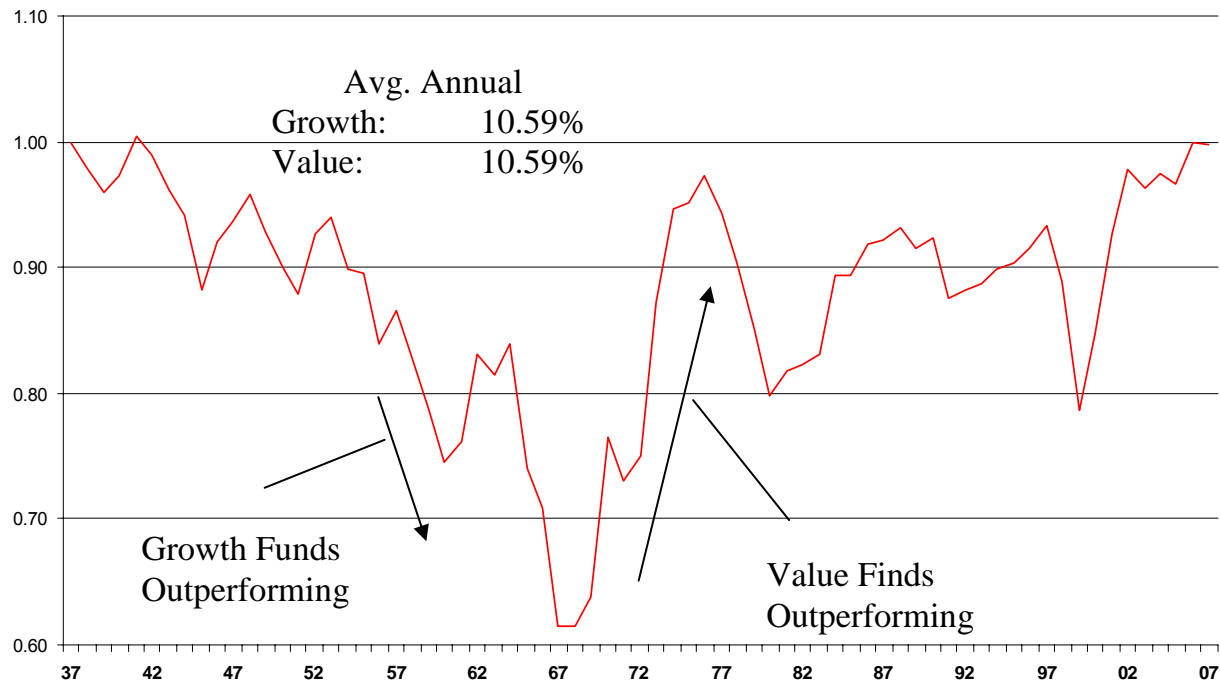
Period	FI (gross)	S&P 500	Portfolio
Annualized Returns	8.10%	1.59%	8.79%
Monthly Volatility	3.84%	3.98%	4.08%
Sharpe Ratio	1.27	-0.42	1.36

A comparison of return characteristics of the (1) Fundamental Index, (2) S&P 500 Index and (3) a hypothetical portfolio for the sample period of January 2000 through December 2007. The fundamental index returns presented here are gross of fees. The hypothetical portfolio is comprised of 33% S&P EWI, 33% Midcap Value, and 33% Russell 1000 Value indices and is rebalanced monthly.



# How Persistent is the Value Effect?

## Reversion to the Mean: Growth Funds vs. Value Funds, 1937-3/2007

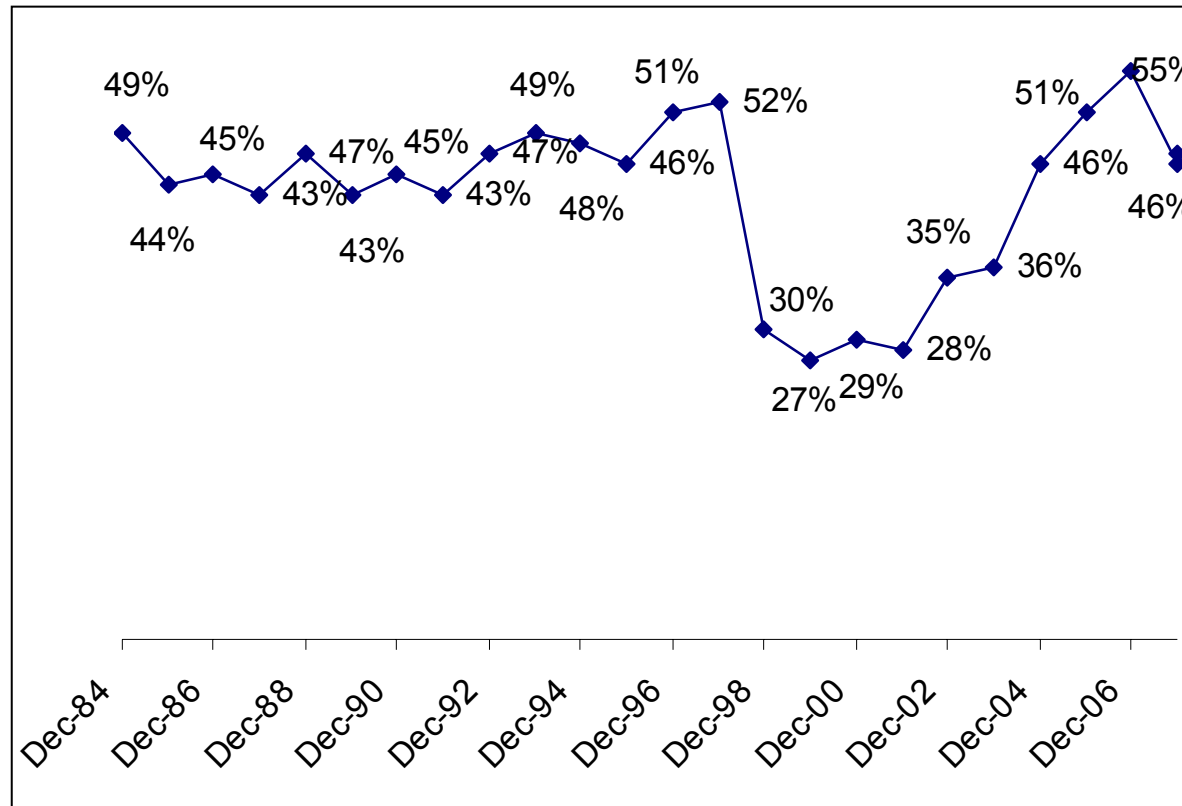


Growth = Lipper Growth  
Value = Lipper Growth & Income



# P/E Compression: Return of Growth?

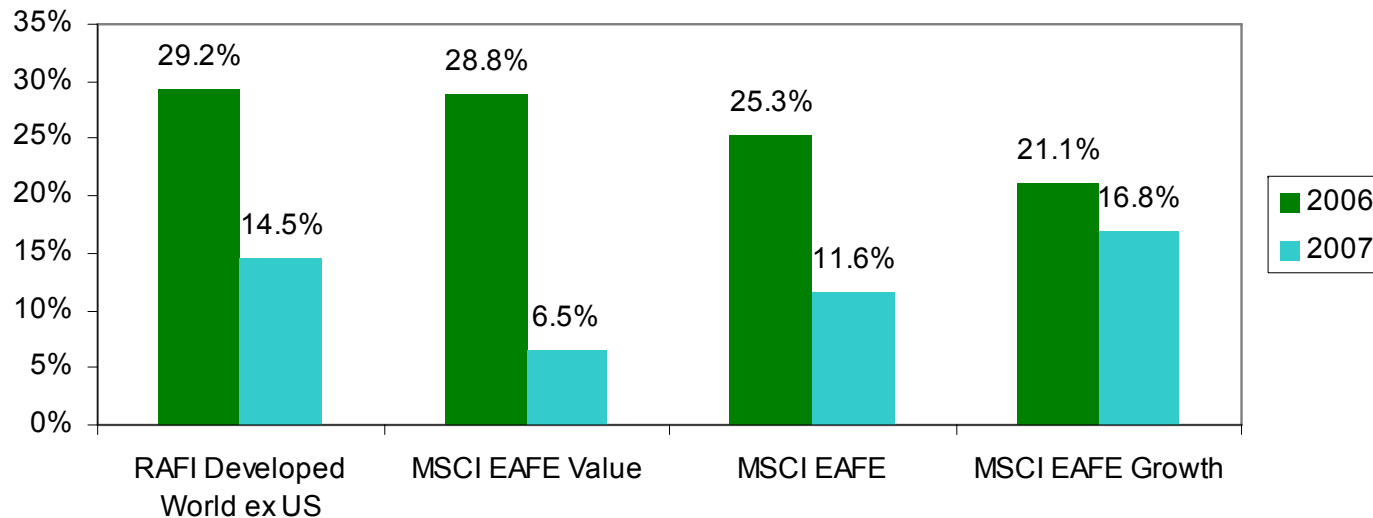
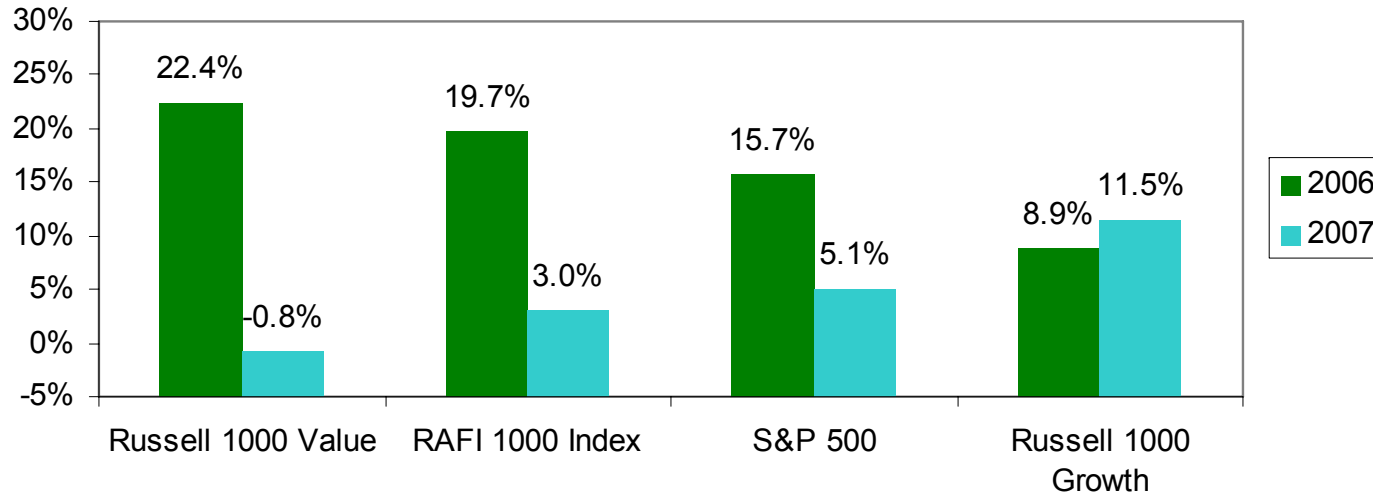
Percentage of S&P stocks within 20% of Median P/E

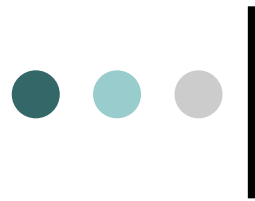


Source: Factset, Morgan Stanley, and Vanguard.



# Recent Performance Comparison





## Conclusion

- Performance of Fundamentally Weighted Indices can be explained by Fama-French risk factors of “size” and “value”
- We appreciate that many investors will be willing to bet on the long-run excess performance of value tilt strategies, through either the RAFI or through a combination of ETF’s.
- Longer-term evidence of mean reversion in the out-performance of “value” tilt strategies should caution investors from dramatically shifting the indexed core holdings of their portfolios away from capitalization weighting.