Reimagining Index Funds

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May 2023

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Key Contributions

- Economic footprint is a more stable measure than market capitalization.
- Economic footprint avoids “buy high, sell low” behavior.
- Economic footprint *should* be proportional to market cap, retaining liquidity and capacity.

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The Process

RACWI Methodology

1. Determine Relative Size of Companies in the Starting Universe Using Fundamental Measures	2. Security Selection
Fundamental size is the equally weighted average of the following four fundamental measures: • Adjusted Sales • Adjusted Cash Flow • Dividends + Buybacks • Book Value + Intangibles	• Create seven regions: United States, Japan, United Kingdom, Europe ex UK, Other Developed, China, EM ex China. • Top 86% by cumulative fundamental weight within each country constitutes large & mid company portfolios.
3. Weighting	**4. Rebalance**
• Selected securities weighted by float-adjusted market capitalization weight.	• Portfolio is reconstituted annually on the third Friday of March.

For illustrative purposes only.
Adjusted Sales – Company sales multiplied by company equity to assets ratio averaged over the past five years.
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Book Value + Intangibles – Most recent company book value plus research capital, with research capital defined as the accumulation of depreciated R&D expenses over the past six years.

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RAFIIndices

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Key Findings

- Generates statistically meaningful Fama-French-Carhart Four-Factor alpha.
- Tracking error to S&P 500 comparable to Russell 1000.
- Lower turnover than S&P 500 or Russell 1000.

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Concerns

But… what is it?

Performance Attribution of US Cap-Weighted Indices Using Fama-French-Carhart Four-Factor Regression, Jul 1991–Dec 2022

	S&P 500	Russell 1000	True CW 500	RACWI 500	RACWI 1000
alpha	0.0%	-0.02%	0.07%	0.40%**	0.37%*
alpha *t*-stat	-	-0.14	0.50	2.83	2.33
Market+	1.00	1.01**	1.01	0.98**	0.99**
Size	0.00	0.06**	0.01	-0.02**	0.03**
Value	0.00	0.00	-0.04**	0.04**	0.04**
Momentum	0.00	0.00	0.01**	0.01*	0.00

Note: The S&P 500 (minus the 3-month T-bill return) is used as the market+ factor in the Fama-French-Carhart Four-Factor regression, and the t-statistic for the market is calculated as the difference from 1.00. Alpha is annualized. * indicates significance at the 5% level and ** indicates significance at the 1% level. Please refer to the note under the first graph for the definitions of each strategy.

Source: Research Affiliates, LLC, based on data from Compustat and CRSP for True CW and RACWI simulations. S&P 500 and Russell 1000 indices' returns are from Factset. Size, value, and momentum factor returns and risk-free returns are from the Kenneth R French Data Library. See disclosures on the use of simulated data at www.researchaffiliates.com/legal/disclosures.

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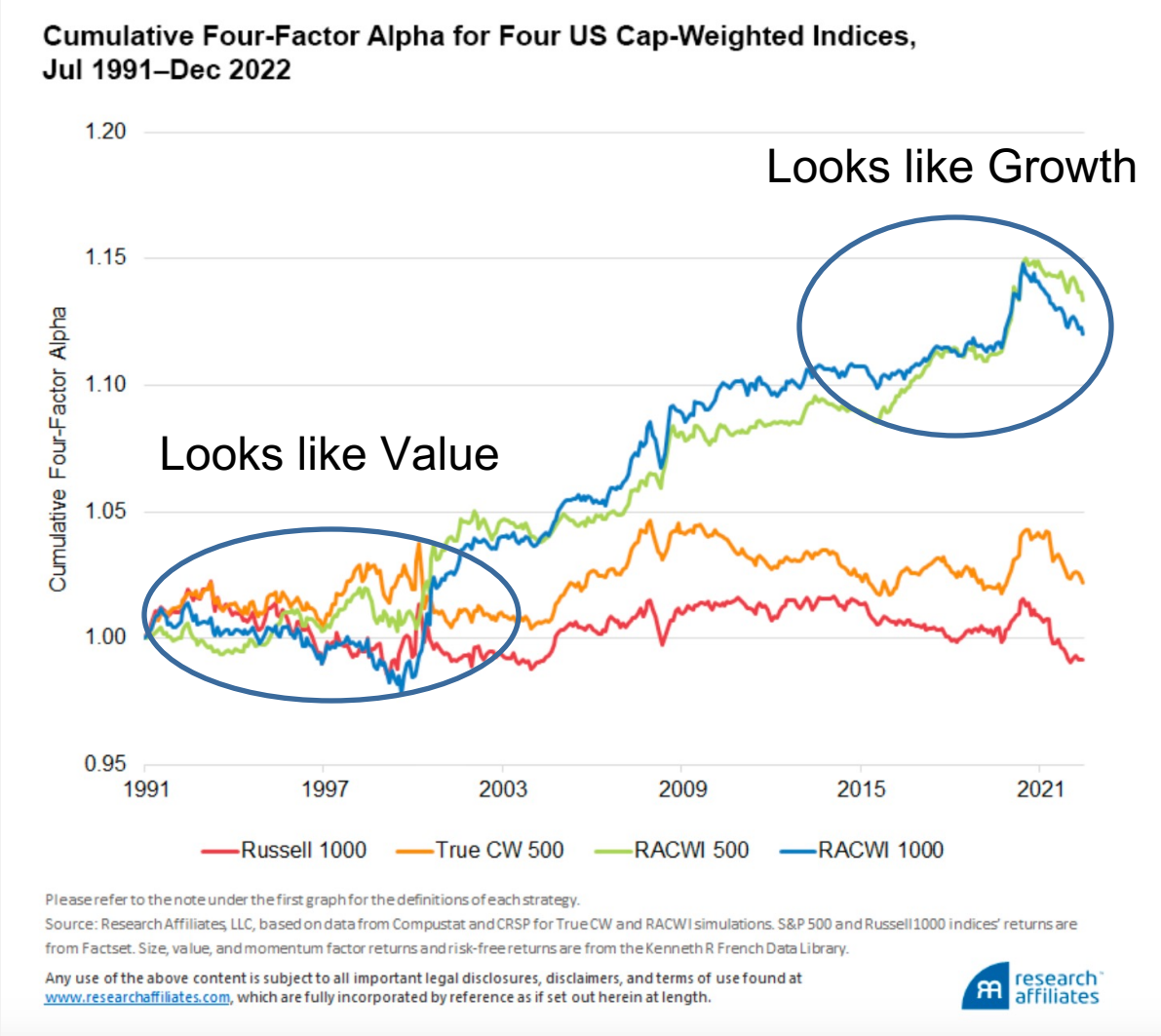
What is it?


Cumulative Four-Factor Alpha for Four US Cap-Weighted Indices, Jul 1991–Dec 2022
Looks like Growth
Looks like Value
Cumulative Four-Factor Alpha
1.20
1.15
1.10
1.05
1.00
0.95
1991
1997
2003
2009
2015
2021
Russell 1000
True CW 500
RACWI 500
RACWI 1000
Please refer to the note under the first graph for the definitions of each strategy.
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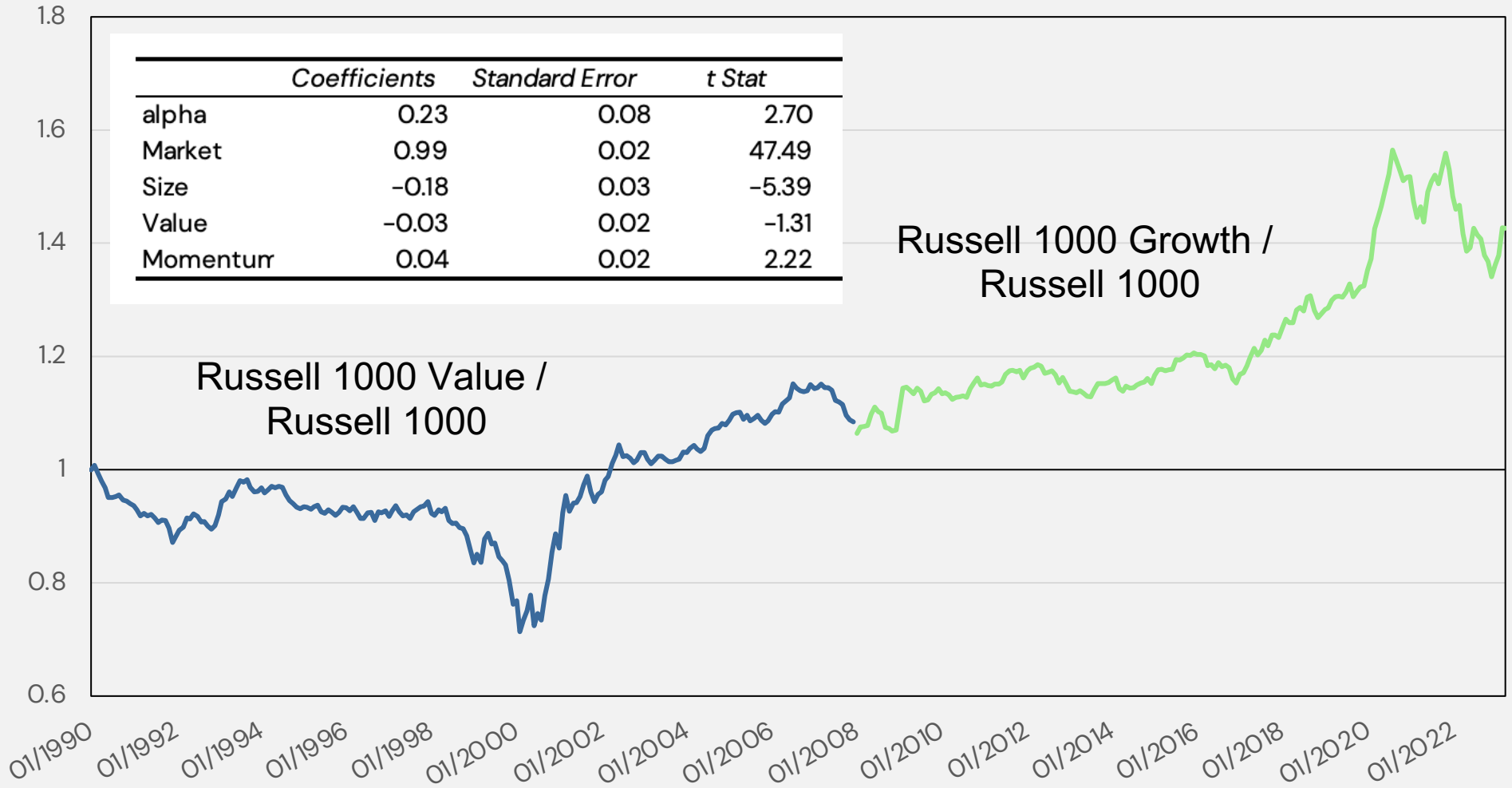
If you squint...

	Coefficients	*Standard Error*	*t Stat*
alpha	0.23	0.08	2.70
Market	0.99	0.02	47.49
Size	-0.18	0.03	-5.39
Value	-0.03	0.02	-1.31
Momentum	0.04	0.02	2.22



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The Economic Footprint… or Multi-Factor Screen?

3. RAFI uses the following four metrics of company size: current book value adjusted for intangibles, five-year-trailing-average sales adjusted for the company's equity-to-asset ratio, five-year-trailing-average cash flow plus the company's R&D expenses, and past five-year-trailing-average dividends plus share repurchases. We average the four metrics, each measured as a percentage of all publicly traded US-headquartered companies, for each stock. The 500, or 1000, largest stocks are selected for RACWI.

$$v_i = \frac{1}{4}\left(\frac{B_i}{B_M} + \frac{S_i}{S_M} + \frac{CF_i}{CF_M} + \frac{D_i}{D_M}\right)$$

Some math later…

$$v_i = \frac{1}{4}\left(\frac{B_i/P_i}{B_M/P_M} + \frac{S_i/P_i}{S_M/P_M} + \frac{CF_i/P_i}{CF_M/P_M} + \frac{D_i/P_i}{D_M/P_M}\right) * w_{i,P}$$

Value Tilt

Market-Cap Weight

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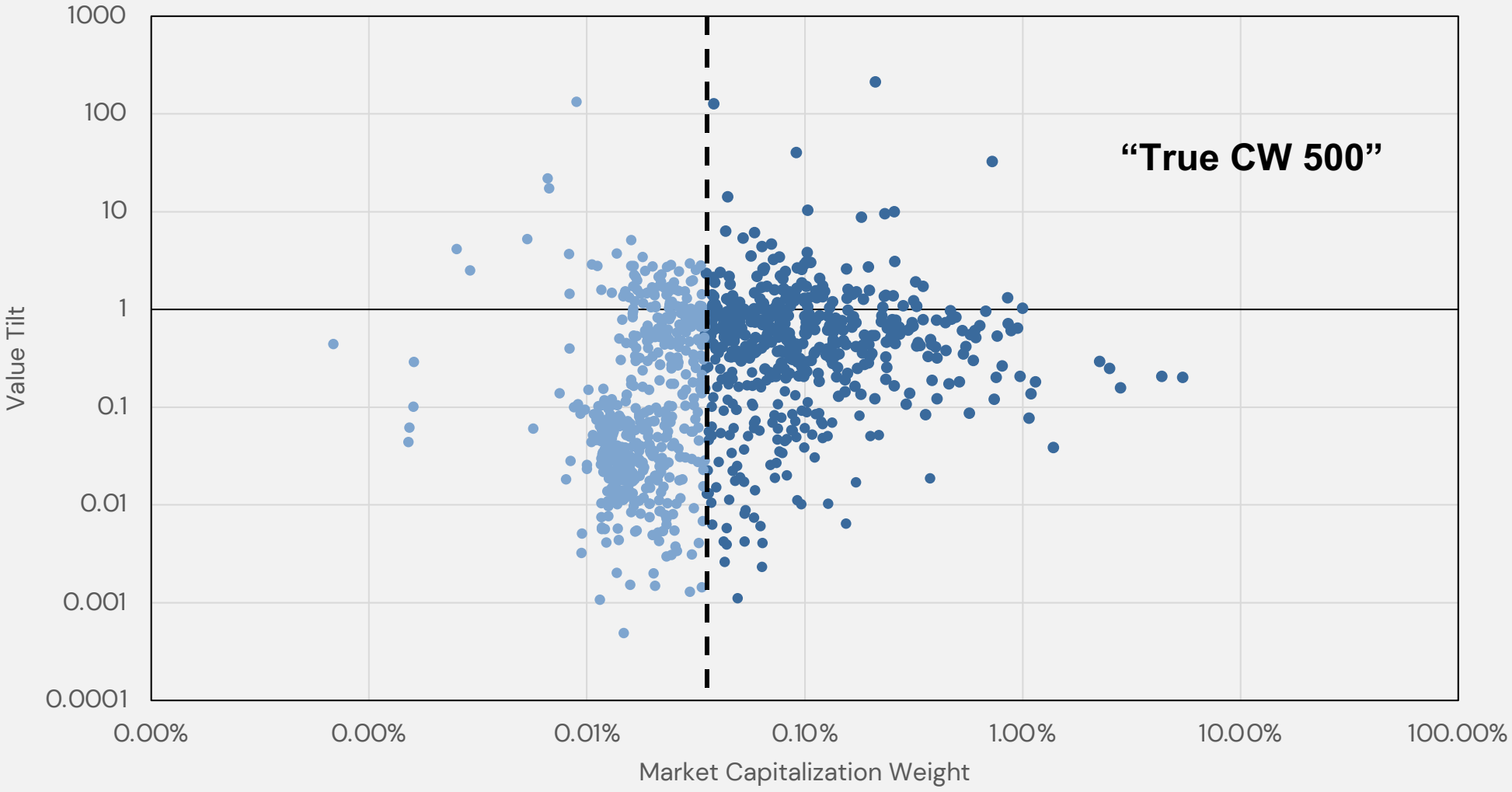
“Economic Footprint” is a Multi-Factor Screen



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“Economic Footprint” is a Multi-Factor Screen

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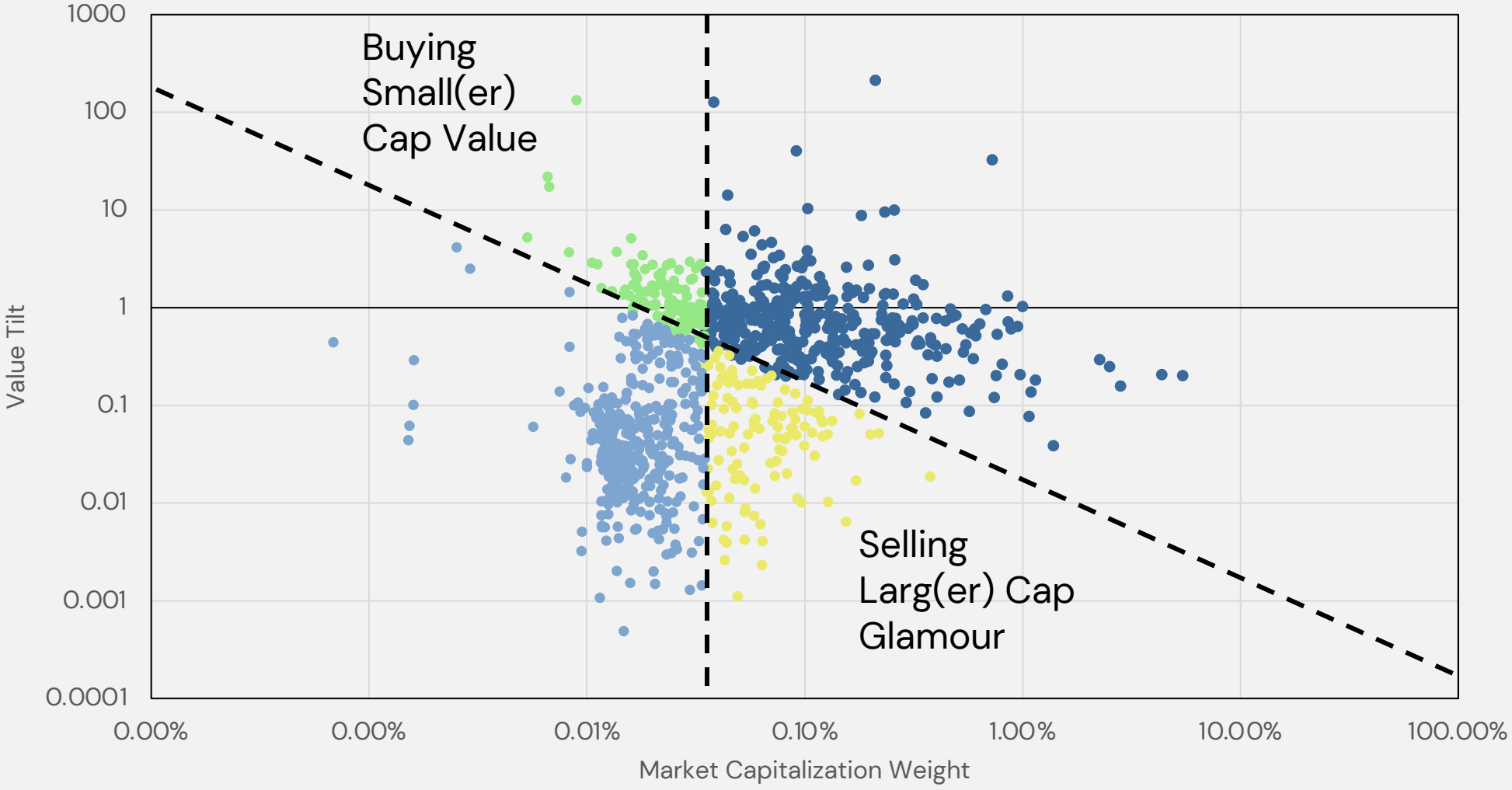

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The Process is *Non-Linear*

RACWI Methodology

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RAFIIndices

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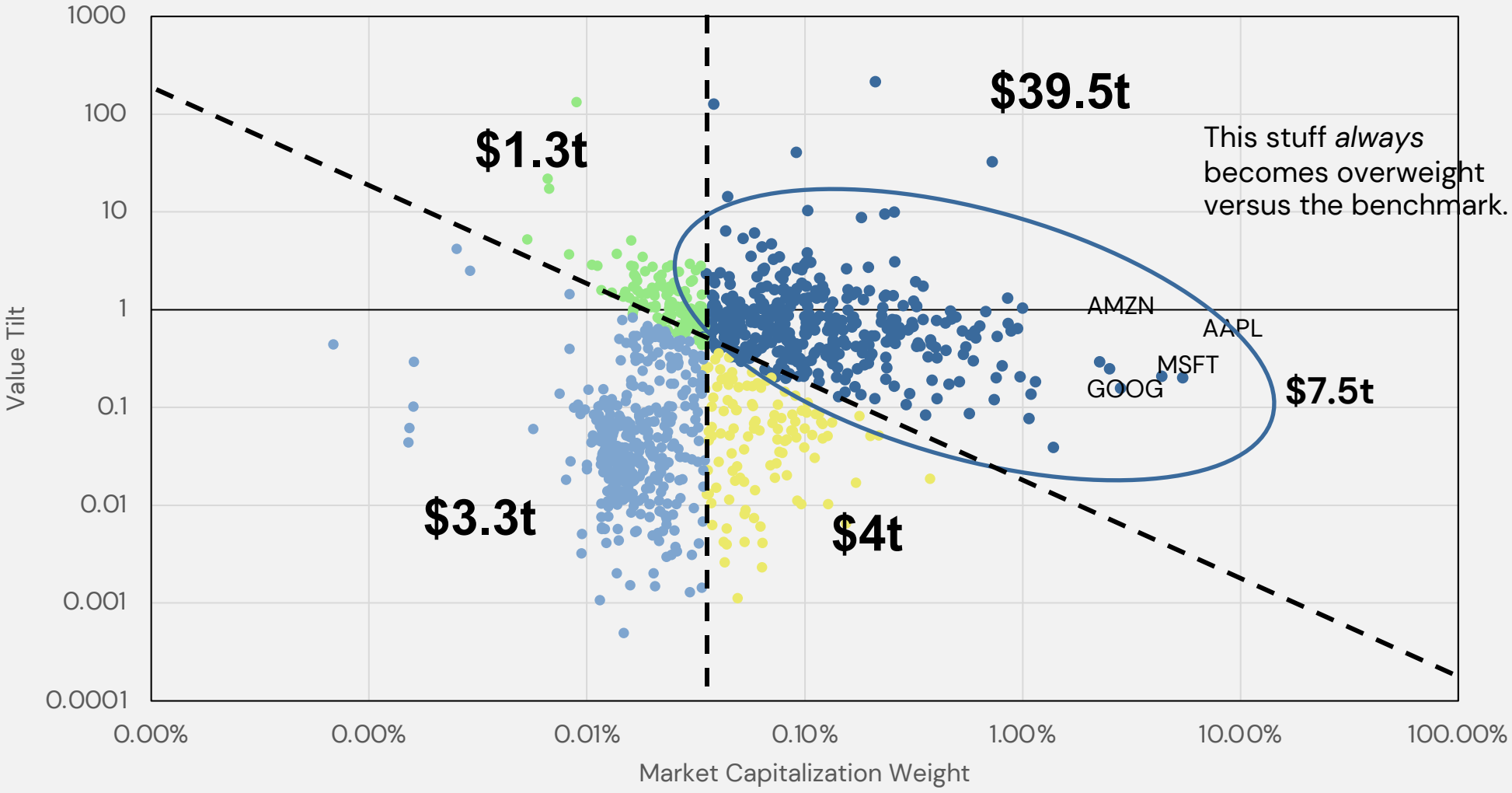
Total Market Capitalization (April 2023)



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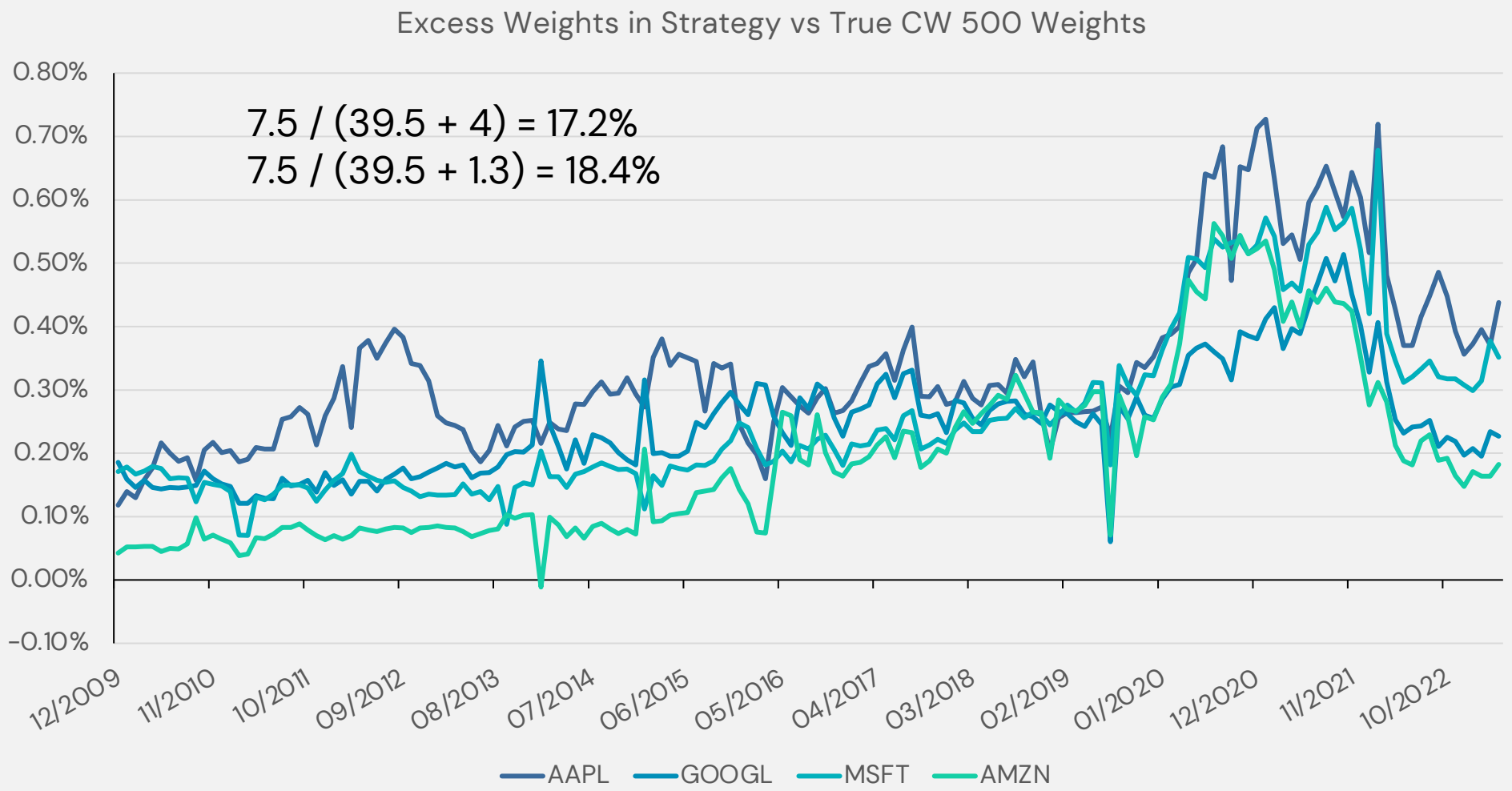
The Mega Caps Got *Bigger*



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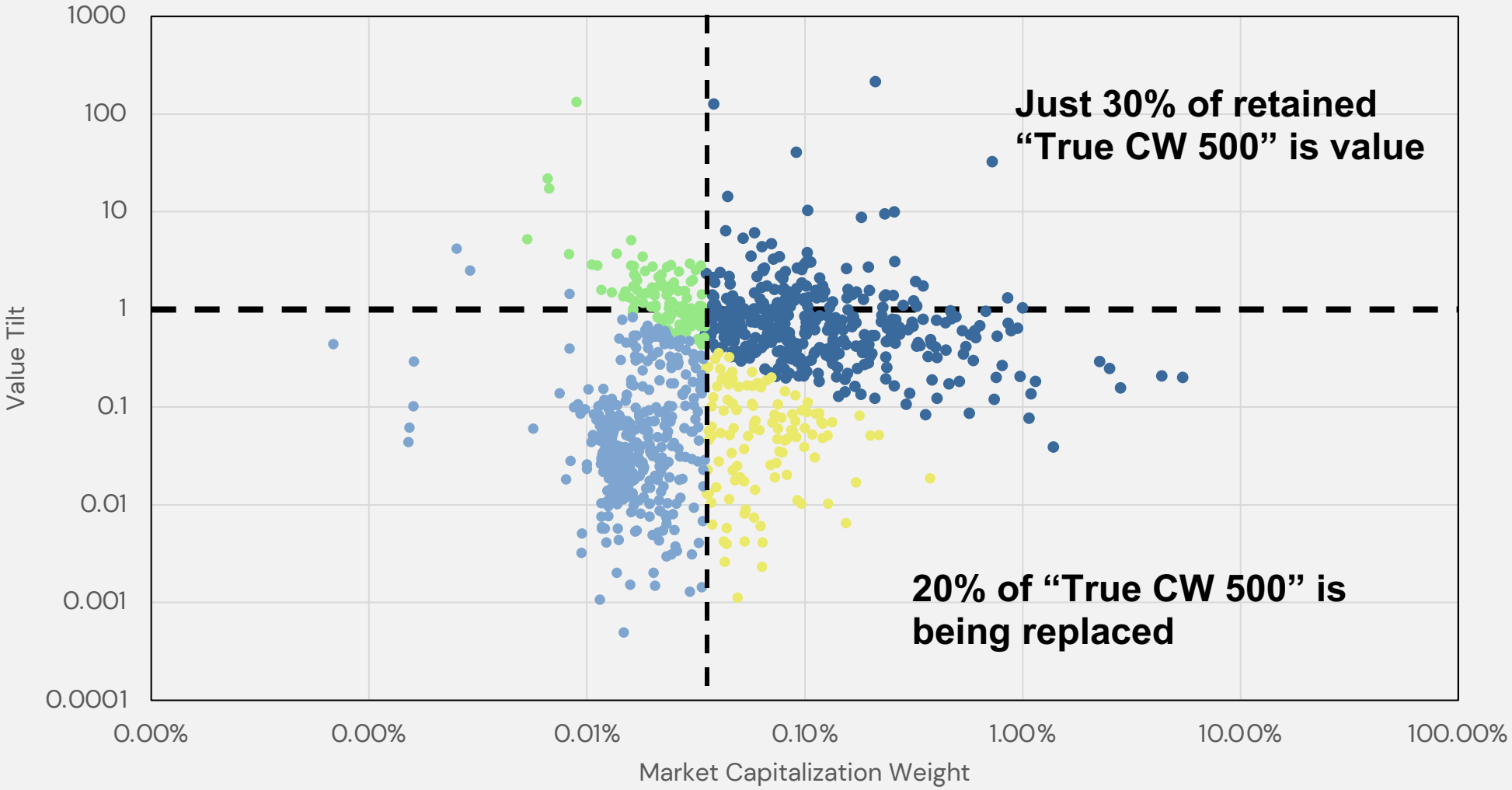
Tilting Towards Growth in 2023



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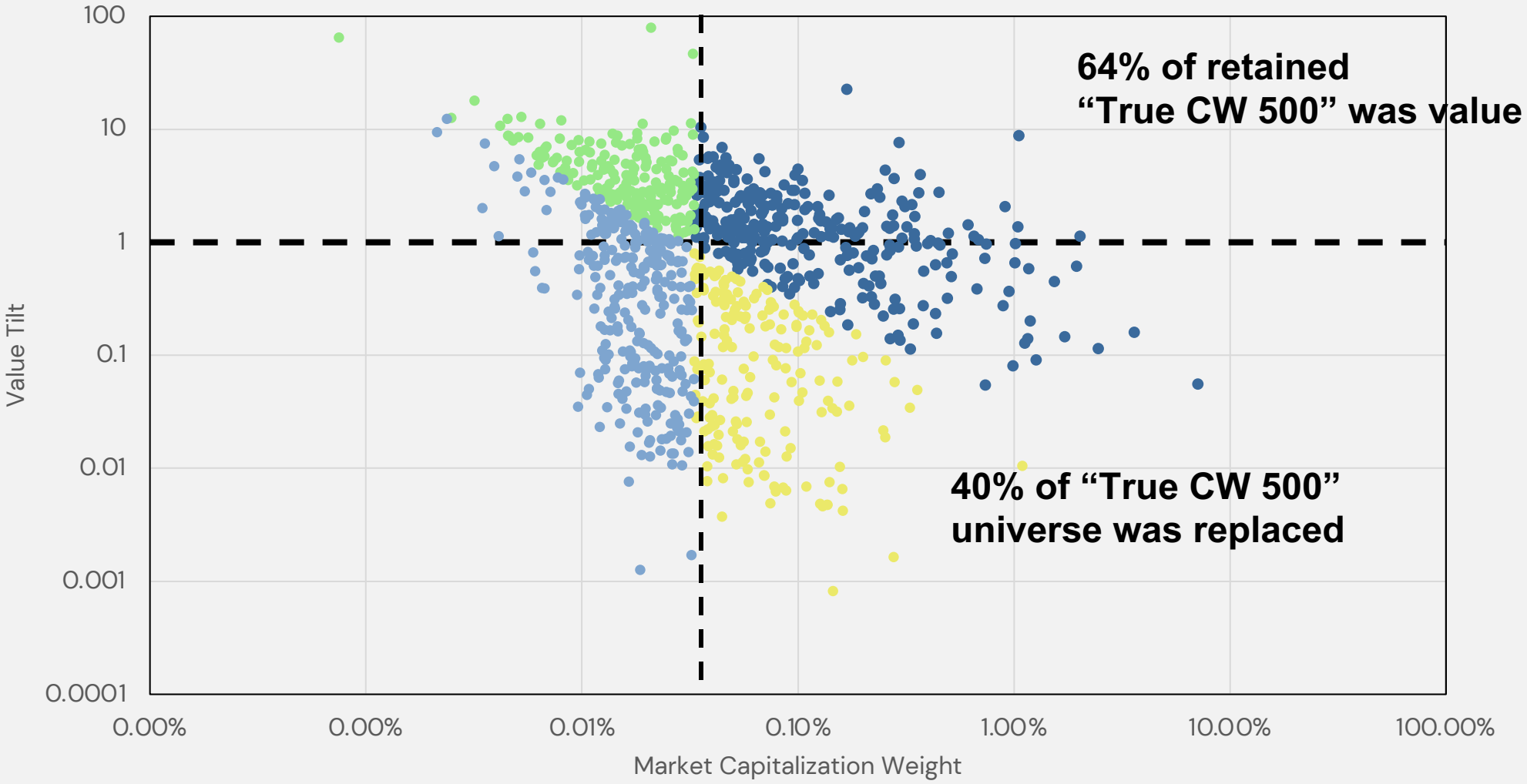
Why Value in 1999?



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In Conclusion

This is a multi-factor screen:
Value x Market Cap.

Large(r) glamour is thrown away and replaced by small(er) value.

The re-weighting dynamic is *key*:

- The "kept" stuff gets larger
- How much was kept?
- Was the kept stuff mostly value or glamour?

One more thing… *Rebalance Timing Luck!*

1. **S&P 500** and **Russell 1000** use proprietary float adjustment in weighting constituent stocks. CRSP does not provide free float data, so we use the raw cap-weight without the free-float adjustment. The performance difference between the two methods is less than five basis points (bps) annually.[5]

2. **True CW 500** selects the 500 largest market-cap US stocks on June 30 of each year and cap-weights them. We call this "True CW (cap-weight)" because the index's construction is utterly formulaic and includes exactly the 500 largest market-cap US-domiciled stocks (i.e., a committee does not choose additions and deletions).

3. **RACWI US 500** selects the stocks of the 500 largest US companies, in March each year, based on a blend of fundamental measures of company size—sales, profits, book value, and dividends (as defined in note 3)—and cap-weights them.

4. **RACWI US 1000** selects the stocks of the 1,000 largest US companies using the same criteria as RACWI 500 and cap-weights them.

Appendix A: The Economic Footprint

3. RAFI uses the following four metrics of company size: current book value adjusted for intangibles, five-year-trailing-average sales adjusted for the company's equity-to-asset ratio, five-year-trailing-average cash flow plus the company's R&D expenses, and past five-year-trailing-average dividends plus share repurchases. We average the four metrics, each measured as a percentage of all publicly traded US-headquartered companies, for each stock. The 500, or 1000, largest stocks are selected for RACWI.

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Appendix A: The Economic Footprint

Define the market-capitalization weight,

$$w_{i,P} = \frac{P_i}{P_M}$$

Then:

$$\frac{v_i}{w_{i,P}} = \frac{1}{4}\left(\frac{B_i/B_M}{P_i/P_M} + \frac{S_i/S_M}{P_i/P_M} + \frac{CF_i/CF_M}{P_i/P_M} + \frac{D_i/D_M}{P_i/P_M}\right)$$

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Appendix A: The Economic Footprint

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Market-Cap Weight

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