

Reimagined Indexing

Can the “Gold Standard” of Cap-Weighting be Improved?

The Genesis of Indexation

- The first index fund strategies appeared in 1972 and 1973.
- The Efficient Market Hypothesis and CAPM support indexing.
- As indexing gained adherents, performance that differed from the benchmark has been viewed as an unwelcome (and usually uncompensated) source of risk.
- As indexers crowd their trading into the “effective date” for any index change, they move share prices... a lot.
- Any indexer who wants to beat the benchmark, can do so with some surprisingly simple expedients, but with some challenges.
 - To win, we must accept modest tracking error, hence periods of modest underperformance.
 - Any indexer who pursues these expedients will need patience from time to time, as will their clients.

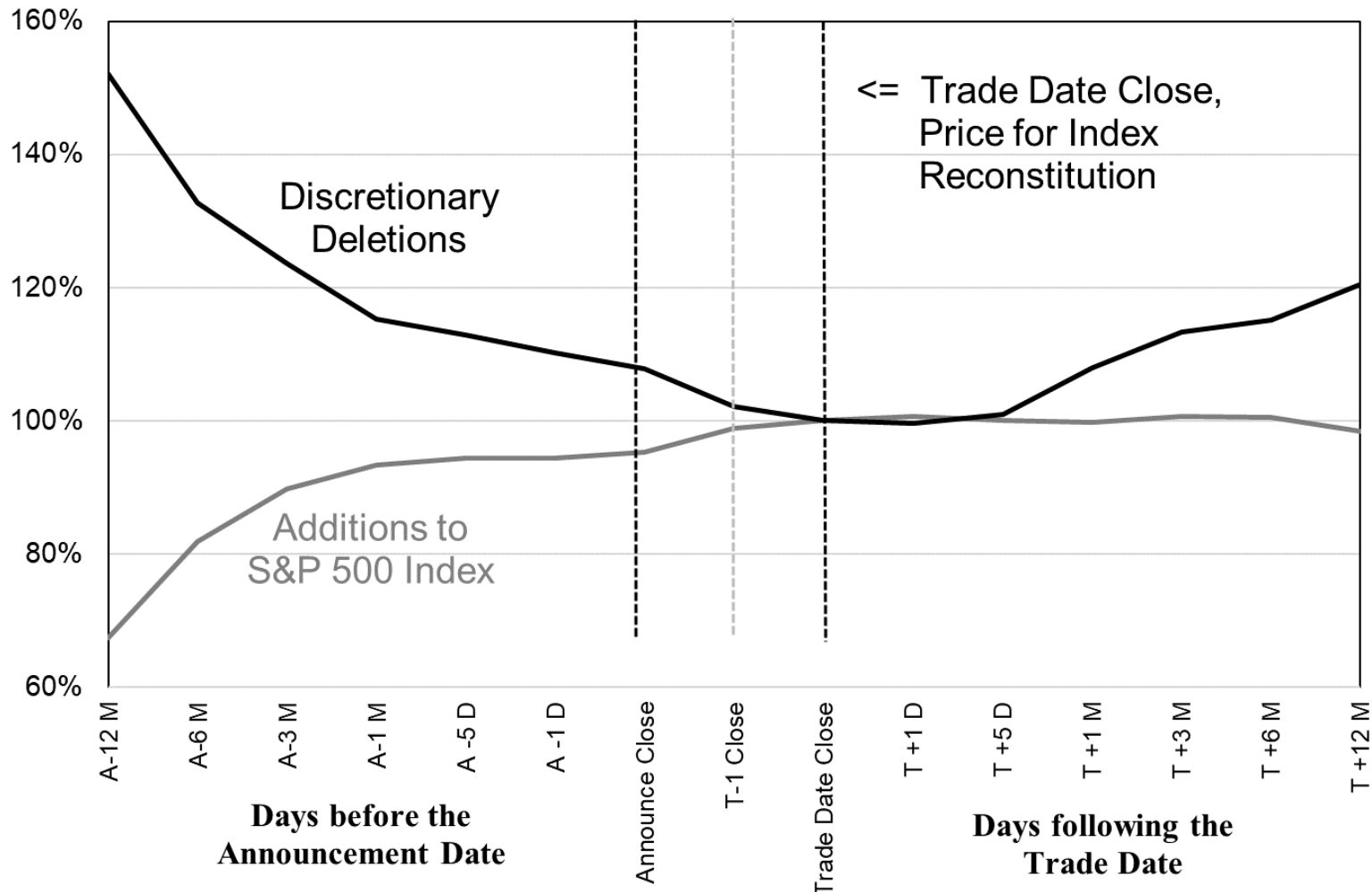
“Gold-Standard” Cap-Weighted Indexing has Two Achilles’ Heels

Two Weaknesses of “Gold standard” Cap-Weighted Indices

1. Inherently overweight overvalued companies and underweights undervalued companies relative to an (unknowable!) fair-value–weighted portfolio, and
2. **Typically add high-flying growth stocks after a recent period of outperformance and drops feared deep-discount value stocks after a recent period of underperformance.**

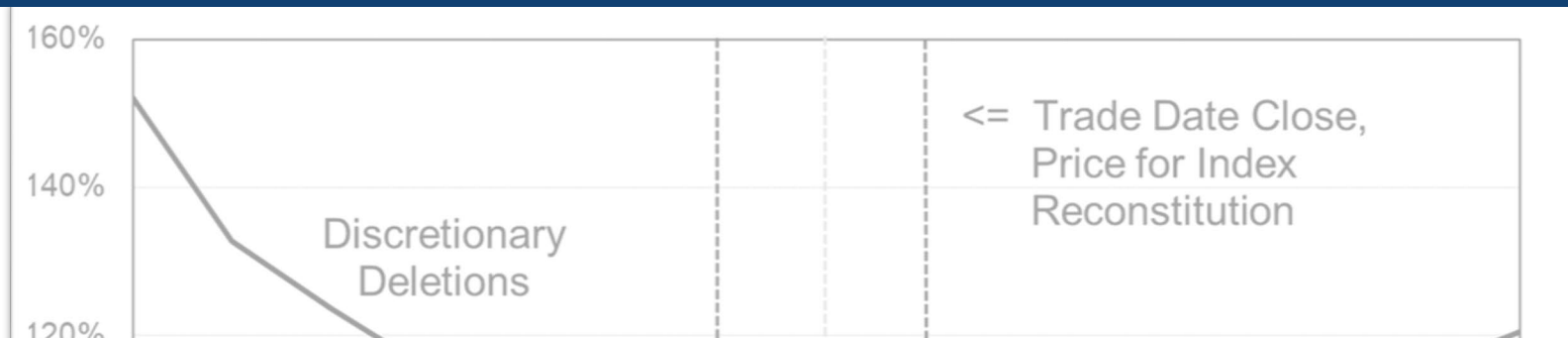
Quantifying the Cost of a “Buy High and Sell Low” Approach

S&P 500 Additions and Deletions' Performance Relative to Market, Oct 1989 – Jun 2021

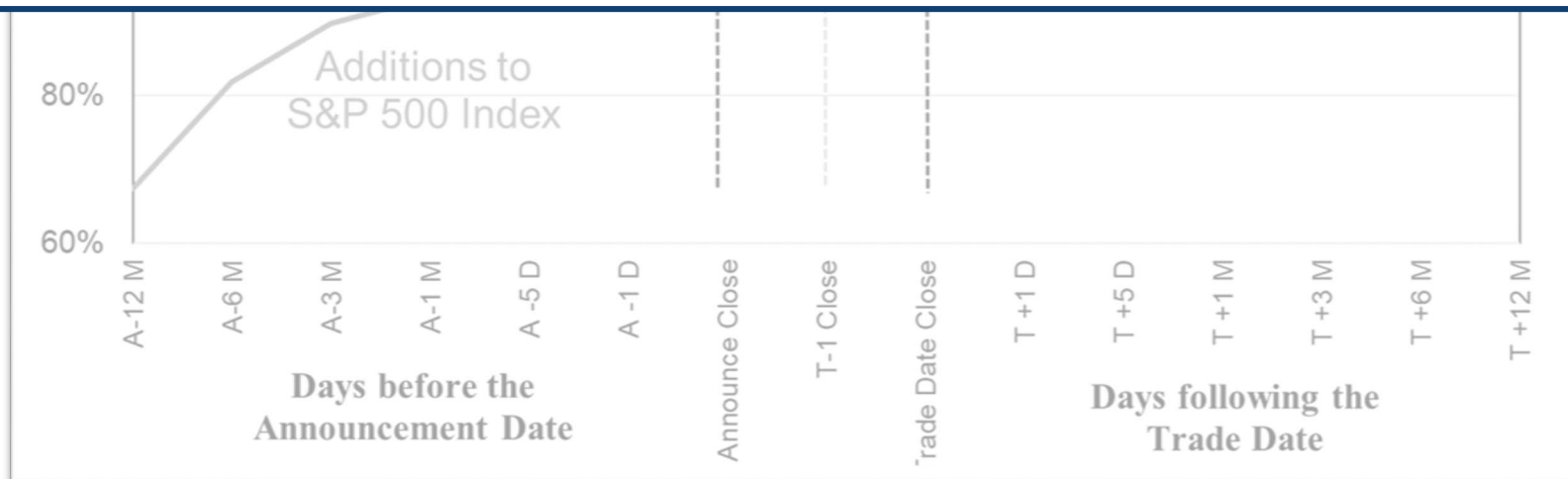


Quantifying the Cost of a “Buy High and Sell Low” Approach

S&P 500 Additions and Deletions' Performance Relative to Market, Oct 1989 – Jun 2021



What if instead we choose stocks based on a stable metric – the size of the underlying business, rather than on market-cap?

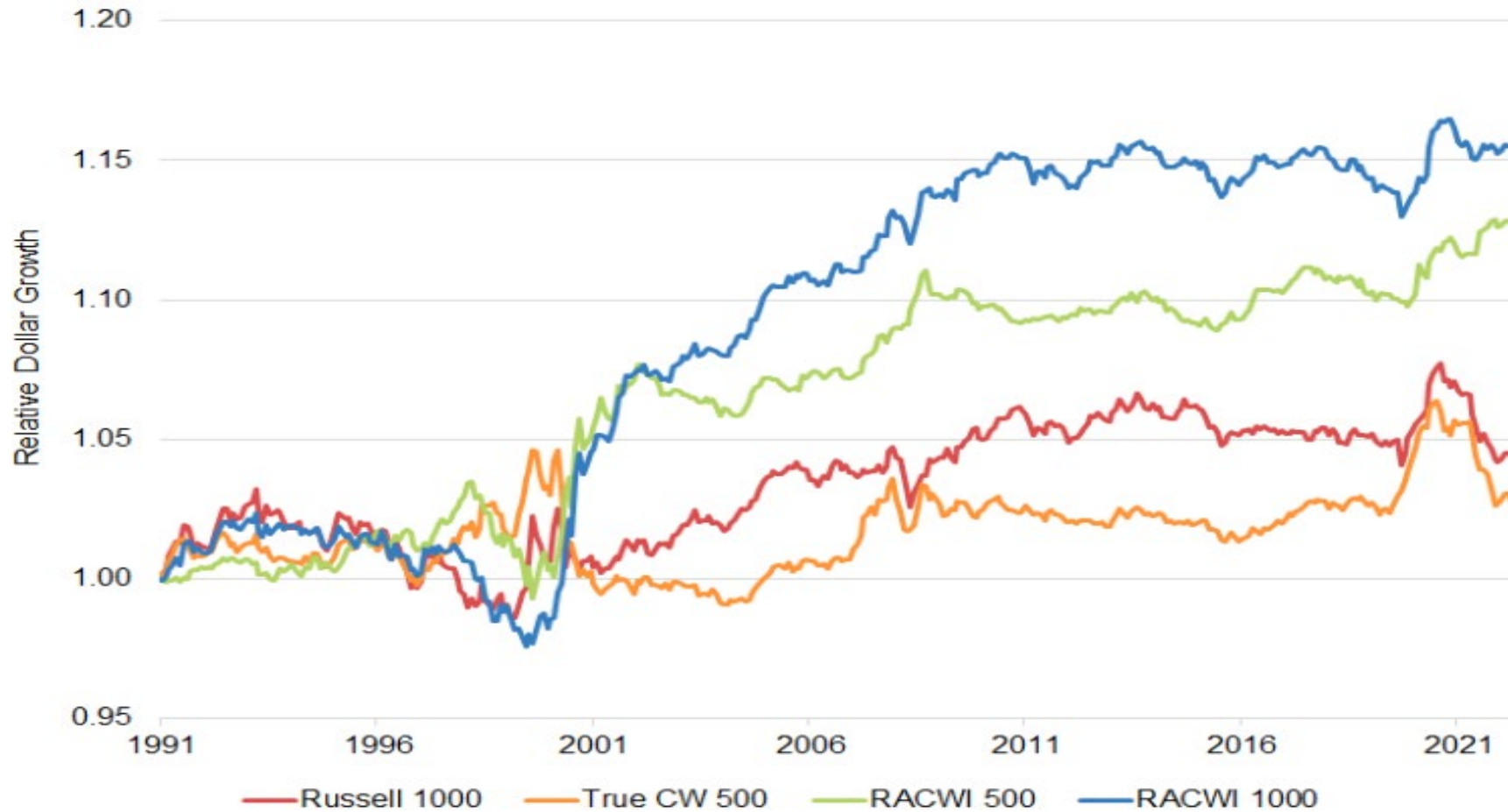


Choosing Index Constituents by Fundamentals

RACWI US (484 Names)			S&P500 (502 Names)		
Large Fundamentals/ Small Cap-Weight	RACWI Weight	Top Holdings	Cap-Weight	Large Cap-Weight/ Small Fundamentals	
	6.94%	Apple	6.59%		
	6.34%	Microsoft	6.02%		
	4.07%	Alphabet	3.95%		
	2.96%	Amazon	2.91%		
Largest in RACWI and Not S&P			Largest Stocks in S&P and Not RACWI		
0.21%	Blackstone	0.0%	0.0%	Medtronic	0.38%
0.12%	Marvell Technology	0.0%	0.0%	ServiceNow	0.30%
0.11%	Waste Connections	0.0%	0.0%	Moderna	0.15%
0.10%	Uber	0.0%	0.0%	AutoZone	0.13%

RACWI Selects Stocks on Fundamentals and Cap-Weights Them

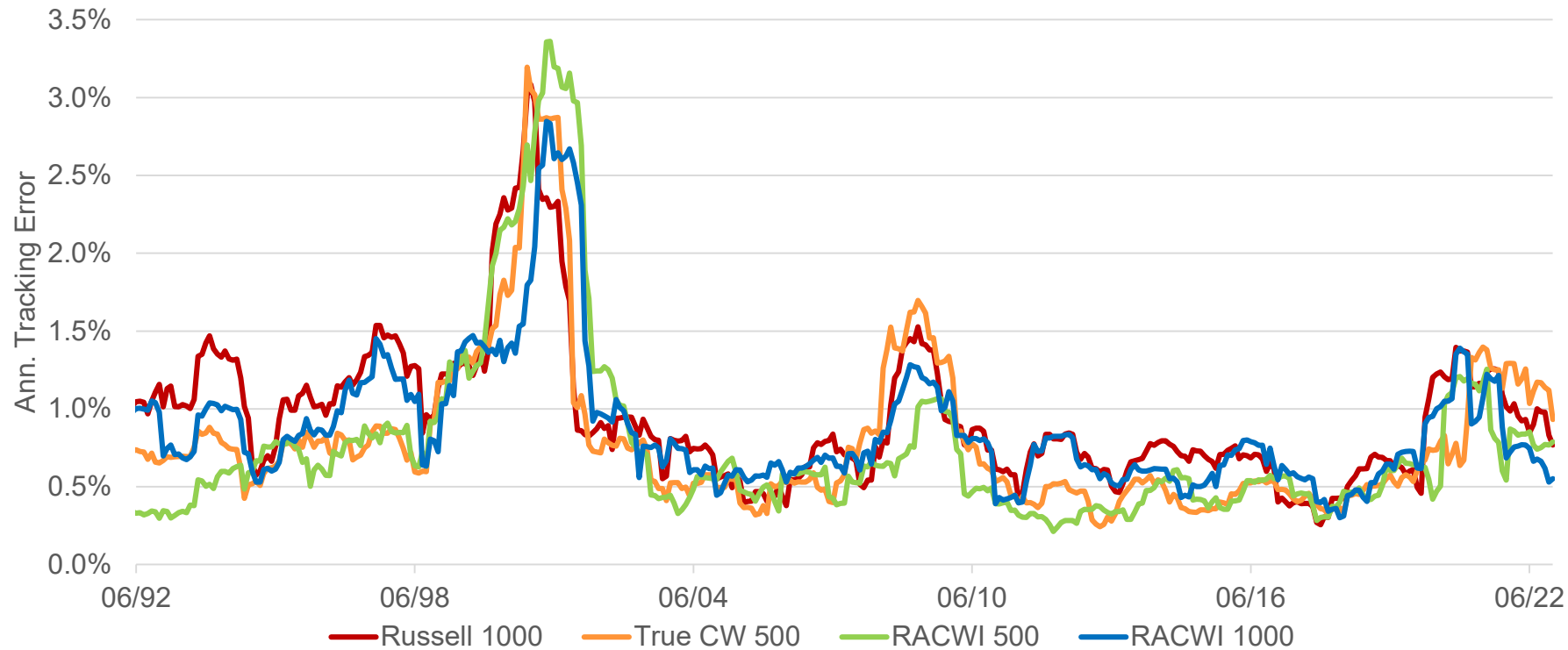
Relative Dollar Growth of Four US Cap-Weighted Indices vs. S&P 500 Index, Jul 1991 – Dec 2022



Outperformance Entails Risk in the Form of Tracking Error

Tracking Error	S&P 500	Russell 1000	True CW 500	RACWI 500	RACWI 1000
S&P 500		1.05%	0.97%	0.97%	1.00%
Russell 1000	1.05%		0.85%	1.52%	1.05%

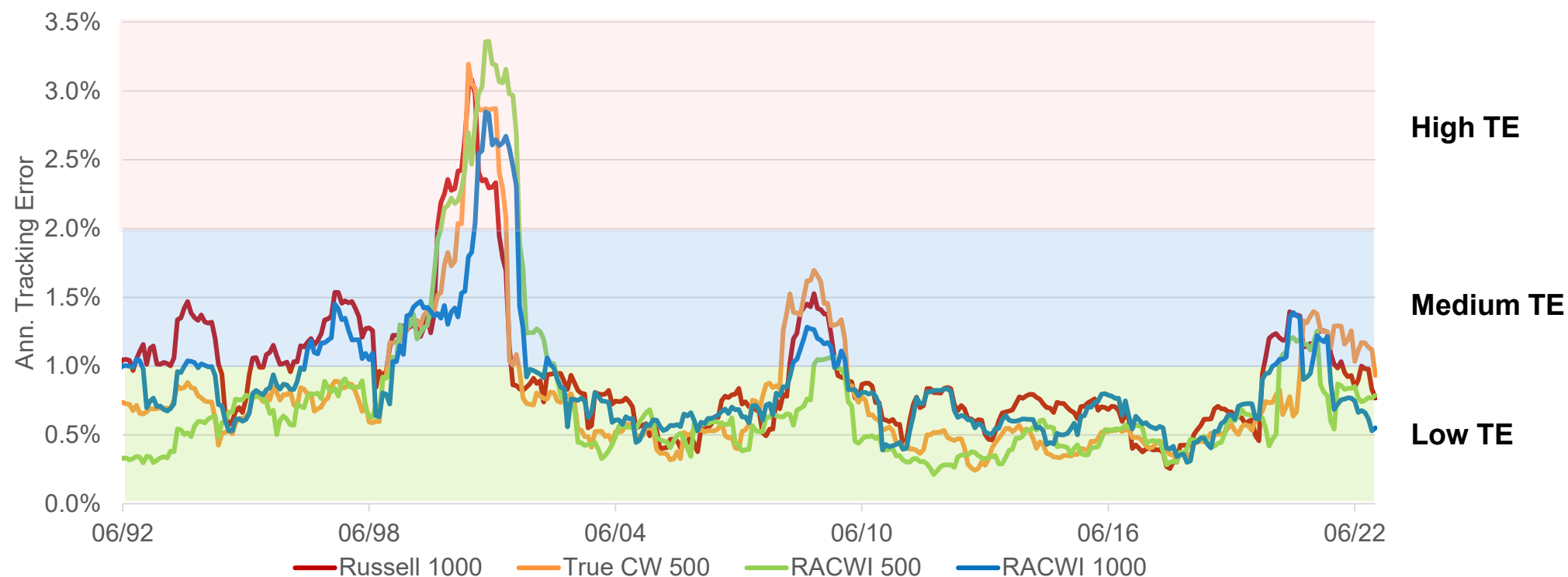
Rolling 12 Month Tracking Error vs. S&P 500



Outperformance Entails Risk in the Form of Tracking Error

Tracking Error	S&P 500	Russell 1000	True CW 500	RACWI 500	RACWI 1000
S&P 500		1.05%	0.97%	0.97%	1.00%
Russell 1000	1.05%		0.85%	1.52%	1.05%

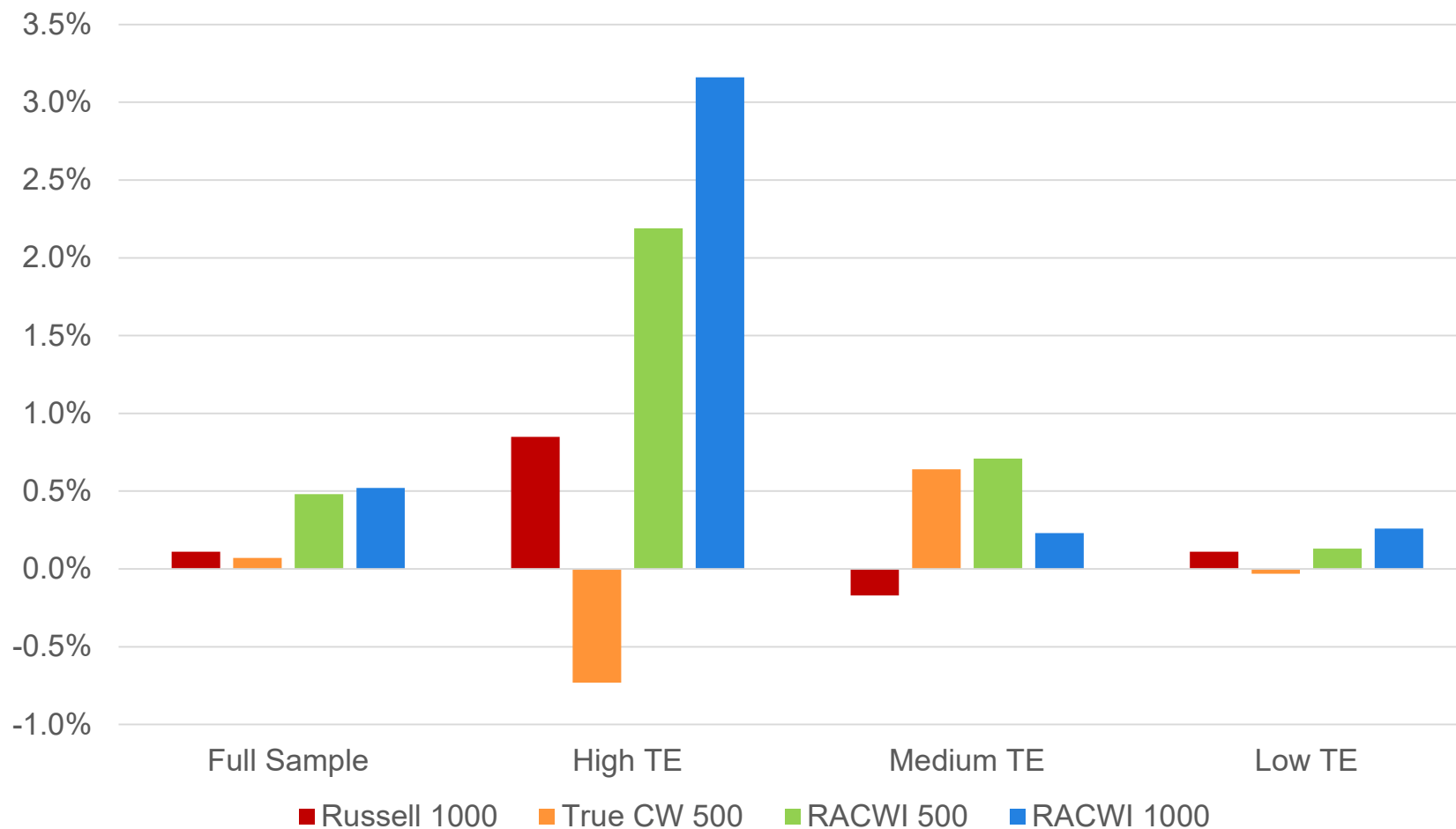
Rolling 12 Month Tracking Error vs. S&P 500



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. July 1991-Dec 2022.

RACWI Shines in High Tracking Error Regimes

Relative Performance of Four Cap Weighted Indexes by Tracking Error Regime, Jul 1991 – Dec 2022

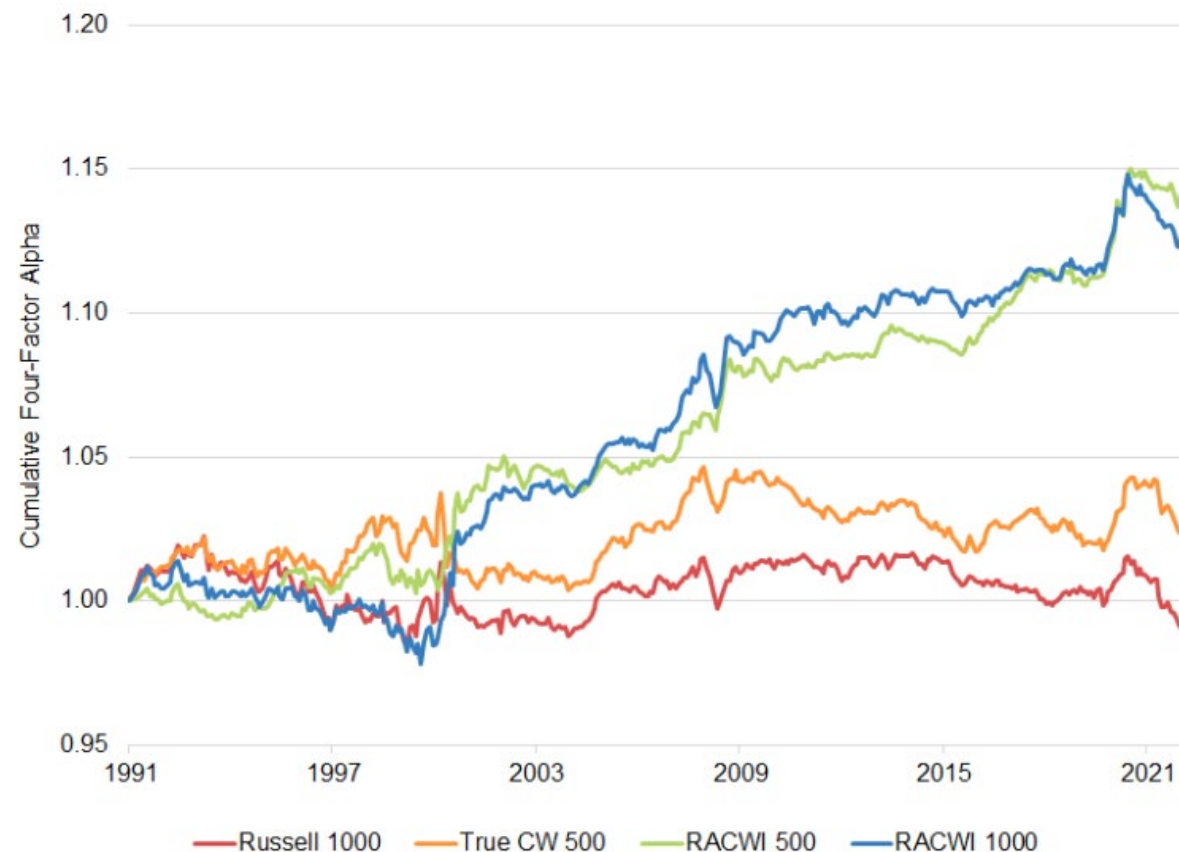


RACWI Alpha Survives Style Adjustments

Cumulative Four-Factor Alpha of Four US Cap-Weighted Indices, Jul 1991 – Dec 2022

	Russell 1000	True CW 500	RACWI 500	RACWI 1000
alpha	-0.02%	0.07%	0.40%**	0.37%*
<i>t-stat</i>	-0.14	0.50	2.83	2.33
Market ⁺	1.01**	1.01	0.98**	0.99
Size	0.06**	0.01	-0.02**	0.03**
Value	0.00	-0.04**	0.04**	0.04**
Momentum	0.00	0.01**	0.01*	0.00

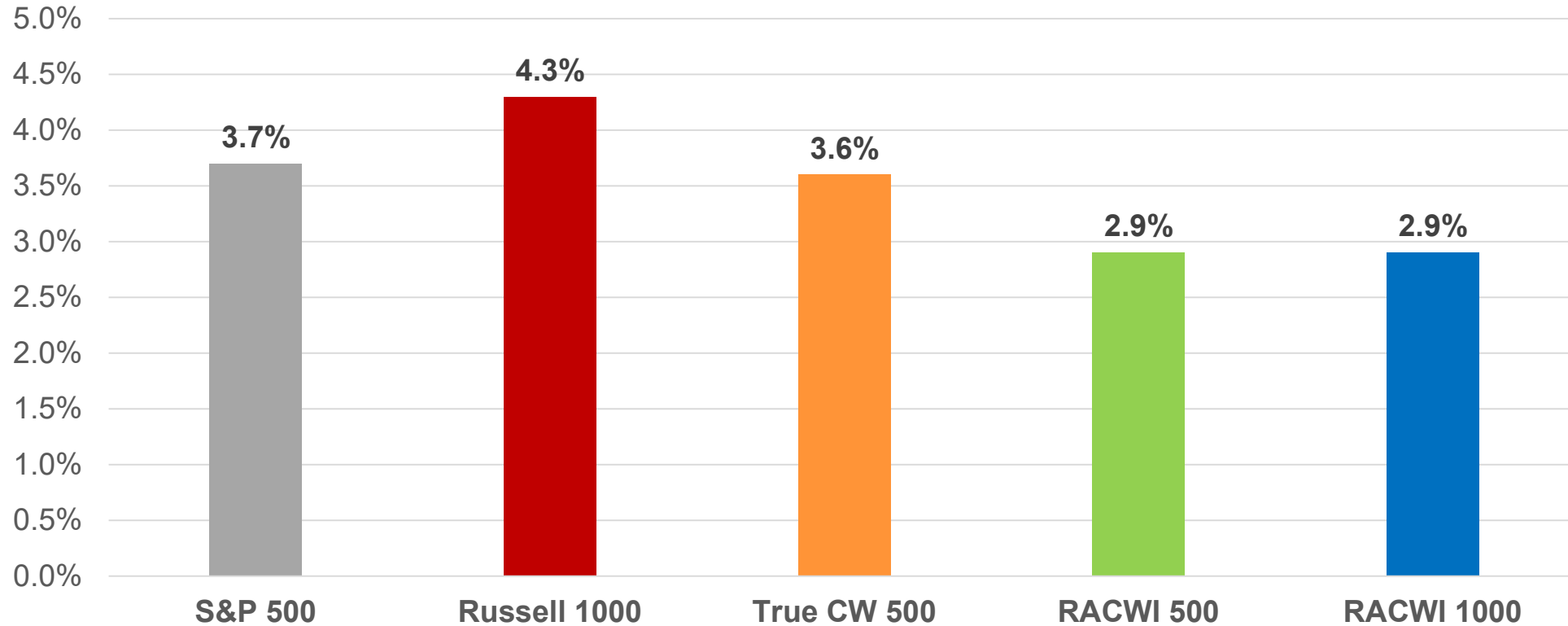
Cumulative Four-Factor Alpha of Four US Cap-Weighted Indices, Jul 1991 – Dec 2022



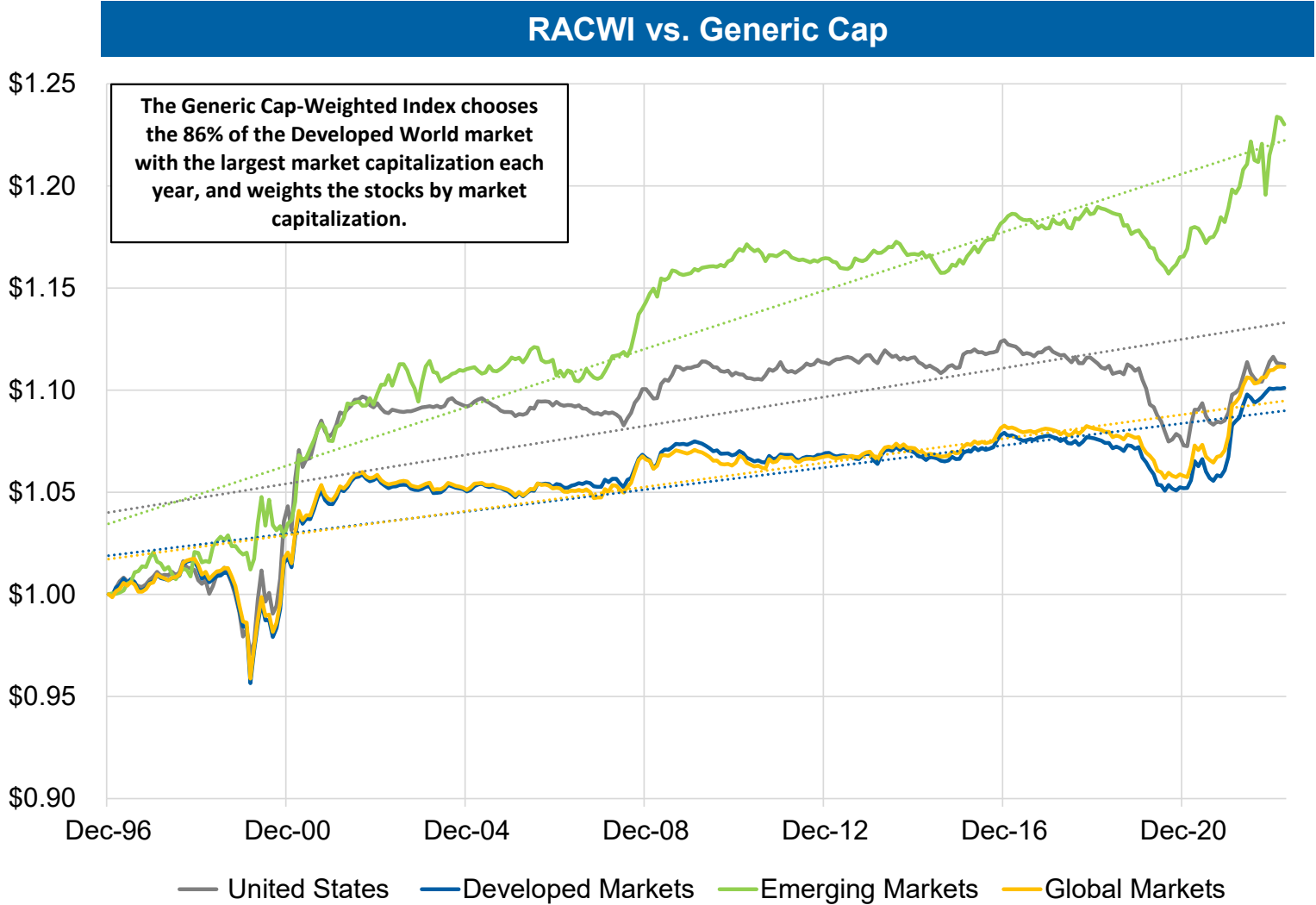
Note: The S&P 500 (minus the 3-month T-bill return) is used as the market⁺ factor in the Fama-French-Carhart Four Factor regression, and the *t*-statistic for the market is calculated as the difference from 1.00. Alpha is annualized. * indicates significance at the 5% level and ** indicates significance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

RACWI Reduces Turnover

Average Annual Turnover of Various US Cap Weighted Indices: 2013-2022



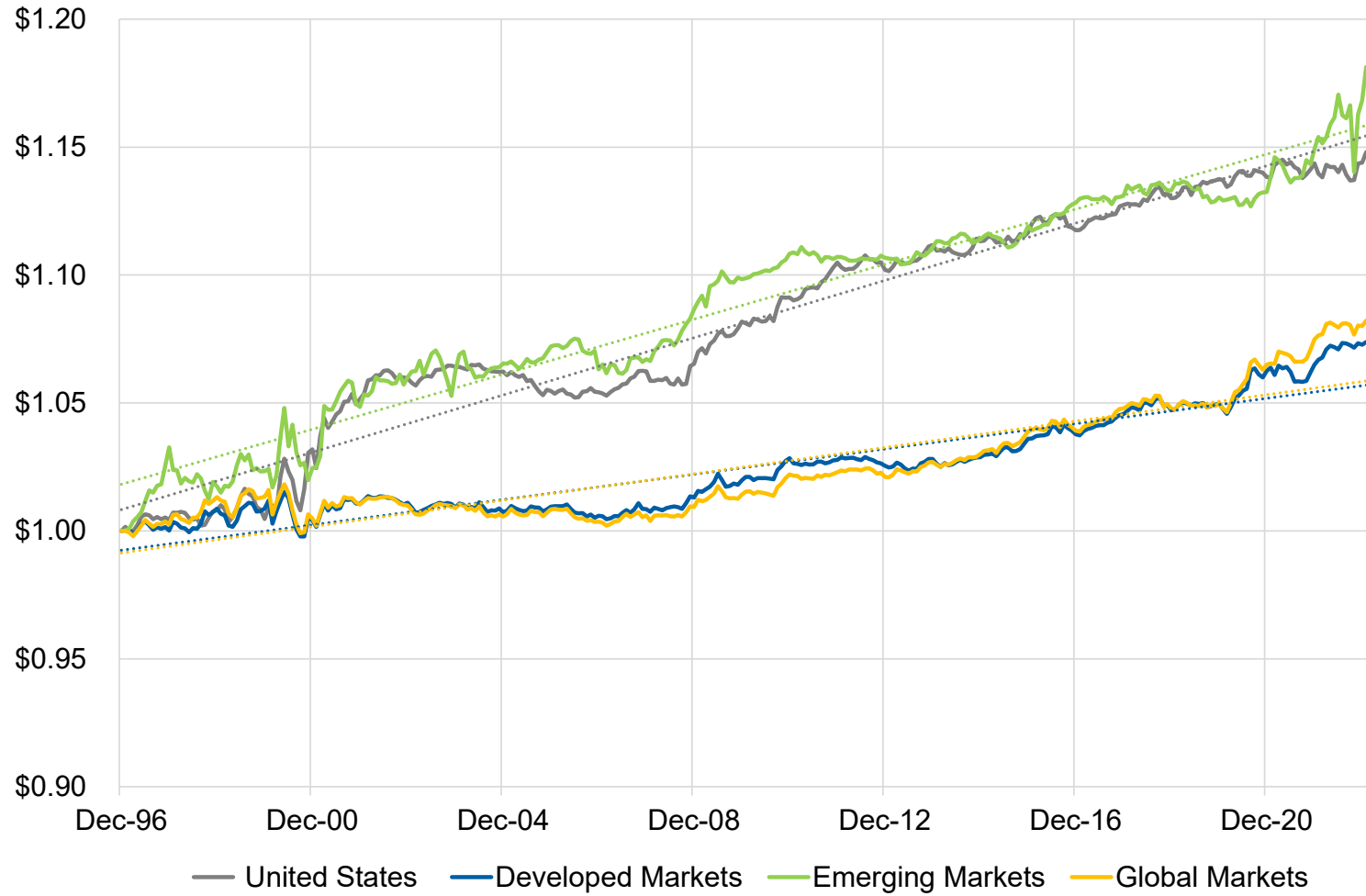
Benefits of RACWI Hold Outside the US



For illustrative purposes only.
 Generic Cap-weight index is simulated. RACWI is simulated through 3/31/2023. RACWI returns through 3/31/2023 are generated from the region subset of the RACWI global index. Please see important information at the end of this presentation regarding simulated data. The graph showing \$1 growth over Dec 1996 through March 2023.
 Source: Research Affiliates, LLC, based on data from Worldscope and Datastream. Data as of 3/31/2023.

Benefits of RACWI Hold Outside the US

Cumulative Alpha, Net of Fama-French Four-Factor Model, Generic Cap vs. RACWI



Live Performance by Region

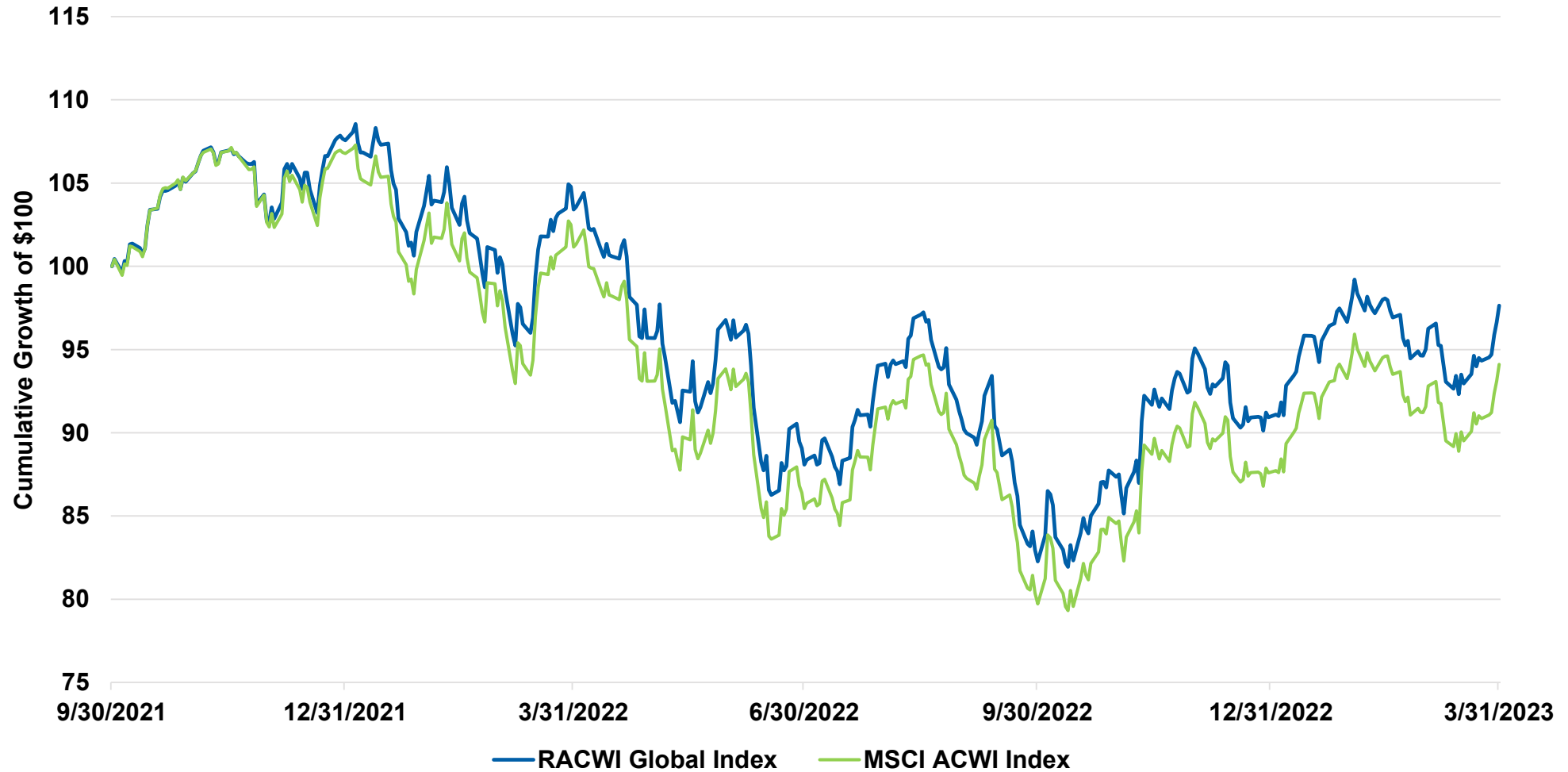
Live Performance and Statistics, September 17, 2021 to March 31, 2023

Annualized Performance	Returns	Excess Returns	Tracking Error	Information Ratio	Number of Constituents*
Global					
RACWI Global	-3.53%	2.46%	1.21%	2.03	2762
MSCI ACWI	-5.98%	-	-	-	2884
US					
RACWI US	-3.42%	0.42%	1.06%	0.39	483
S&P 500	-3.84%	-	-	-	503
Developed Europe					
RACWI Europe	-0.38%	1.83%	1.53%	1.19	402
MSCI Europe	-2.21%	-	-	-	470
UK					
RACWI UK	5.90%	4.01%	2.13%	1.88	70
FTSE 100	1.88%	-	-	-	100
Japan					
RACWI Japan	-10.70%	1.15%	1.00%	1.15	371
MSCI Japan	-11.85%	-	-	-	237
EM					
RACWI EM	-8.78%	3.95%	3.62%	1.09	1192
MSCI EM	-12.73%	-	-	-	1377

Source: Research Affiliates, LLC, using data from FactSet, FTSE Russell and MSCI.

Note: For illustrative purpose only. Period from 9/17/2021 – 3/31/2023. Annualized Returns are in USD. Tracking Error annualized. RACWI inception date is 9/17/2021.

Inception To Date Performance: Global



Source: Research Affiliates, LLC, using data from FactSet and MSCI.
Note: For illustrative purpose only. Period from 9/30/2021 – 3/31/2023. Annualized Returns are in USD. Tracking Error annualized.

Thank you



researchaffiliates.com



THE INDEX COMPANY OF RESEARCH AFFILIATES

rafi.com

Follow Us For More Insights



[@RA_Insights](https://twitter.com/@RA_Insights)



[@Research-Affiliates](https://www.linkedin.com/company/Research-Affiliates)

Important Information

By accepting this document, you agree to keep its contents confidential. You also agree not to disclose the contents of this document to third parties without the prior written permission of Research Affiliates, LLC ("RA") or its affiliated entities.

The material contained in this document is for informational purposes only. This material is not intended as an offer or solicitation for the purchase or sale of any security or financial instrument, nor is it advice or a recommendation to enter into any transaction. The information contained herein may be opinions, which are subject to change, at any time, and should not be construed as financial or investment advice on any subject matter.

Past performance is not indicative of future results. Performance of a product may change significantly over time and yield materially different results in the future. Certain performance information presented represents simulated performance or performance based on combined simulated index data (pre-index launch) and live index data (post-index launch). Hypothetical investor accounts depicted are not representative of actual client accounts. Indexes are unmanaged and cannot be invested in directly. Past simulated performance is no guarantee of future performance and does not represent actual performance of an investment product based on an index. No allowance has been made for trading costs, management fees, or other costs associated with asset management, as the information provided relates only to the index itself. Actual investment results will differ. As such, the simulated data may have under-or over-compensated for the impact, if any, of certain market factors. Simulated returns may not reflect the impact that material economic and market factors might have had on the advisor's decision making if the advisor were actually managing clients' money. Simulated data is subject to the fact that it is designed with the benefit of hindsight. Simulated returns carry the risk that actual performance is not as depicted due to inaccurate predictive modeling. Simulated returns cannot predict how an investment strategy will perform in the future. Simulated returns should not be considered indicative of the skill of the advisor. Investors may experience loss of all or some of their investment. With the exception of the data on Research Affiliates Fundamental Index, all other information and data are generally based on information and data from third party sources.

RA, its affiliates, agents, and each of their respective officers, directors, employees, agents, representatives and licensors (collectively "Research Affiliates") do not make any warranties, express or implied, to anyone regarding the information provided herein, including, without limitation, any warranties with respect to the timeliness, sequence, accuracy, completeness, currentness, merchantability, quality or fitness for a particular purpose or any warranties as to the results to be obtained by any third-party in connection with the use of the information. Nothing contained in this material is intended to constitute legal, tax, securities or investment advice, nor an opinion regarding the appropriateness of any investment, nor a solicitation of any type. The general information contained in this material should not be acted upon without obtaining specific legal, tax and investment advice from a licensed professional. Investors should be aware of the risks associated with data sources and quantitative processes used to create the content contained herein or the investment management process. Errors may exist in data acquired from third party vendors, the construction or coding of indices or model portfolios, and the construction of the spreadsheets, results or information provided. Research Affiliates takes reasonable steps to eliminate or mitigate errors, and to identify data and process errors so as to minimize the potential impact of such errors; however, Research Affiliates cannot guarantee that such errors will not occur. Use of this material is conditioned upon, and evidence of, the user's full release of Research

Affiliates from any liability or responsibility to any third party for any loss or damage, direct, indirect or consequential, arising from or related to (i) any inaccuracy or incompleteness in, errors or omissions in the provided information or (ii) any decision made or action taken by any third party in reliance upon this information. Research Affiliates shall not be liable to anyone for loss of business revenues, lost profits or any indirect, consequential, special or similar damages whatsoever, whether in contract, tort or otherwise, even if advised of the possibility of such damages.

The trademarks Fundamental Index™, RAFI™, Research Affiliates Equity™, RAE™, and the Research Affiliates™ trademark and corporate name and all related logos are the exclusive intellectual property of RA and, in some cases, are registered trademarks in the U.S. and other countries. Various features of the Fundamental Index methodology, including an accounting data-based non-capitalization data processing system and method for creating and weighting an index of securities, are protected by various patents of RA. (See applicable US Patents, Patent Publications and protected trademarks located at <https://www.researchaffiliates.com/legal/disclosures#patent-trademarks-and-copyrights>, which are fully incorporated herein.) Any use of these trademarks, logos, or patented methodologies without the prior written permission of RA is expressly prohibited. RA reserves the right to take any and all necessary action to preserve all of its rights, title, and interest in and to these marks and patents.

Frank Russell Company is the source and owner of the Russell index data contained or reflected in this material and copyrights related thereto. Frank Russell Company and RA have entered into a strategic alliance with respect to the Russell RAFI Indexes. The Russell RAFI Indexes are calculated by Russell in conjunction with RA. All intellectual property rights in the Russell RAFI Indexes (the "Index") vest in Russell and RA. Neither Russell nor RA nor their licensors accept any liability for any errors or omissions in the Index and/or Index ratings or underlying data. No further distribution of Russell Data is permitted without Russell's express written consent. Russell® is a trademark of Frank Russell Company. RA is the owner of the trademarks, service marks, patents and copyrights related to the Fundamental Index and the Fundamental Index methodology. The presentation may contain confidential information and unauthorized use, disclosure, copying, dissemination, or redistribution is strictly prohibited. Frank Russell Company is not responsible for the formatting or configuration of this material or for any inaccuracy in Research Affiliates' presentation thereof.

The FTSE Research Affiliates Fundamental Indexes are calculated by FTSE International Limited ("FTSE") in conjunction with RA. All rights and interests in the FTSE Research Affiliates Fundamental Indexes vest in FTSE. All rights in and to the RA fundamental weighting methodology used in the calculation of the FTSE Research Affiliates Fundamental Indexes vest in RA. All rights in the FTSE indices and/or FTSE ratings (together the "FTSE Data") vest in FTSE and/or its licensors. Except to the extent disallowed by applicable law, neither FTSE nor RA nor their licensors shall be liable (including in negligence) for any loss arising out of use of the FTSE Research Affiliates Fundamental Indexes, the FTSE Data or underlying data by any person. "FTSE™" is a trademark of the London Stock Exchange Plc and is used by FTSE under license. FTSE is not an investment adviser and makes no representation regarding the advisability of investing in any security. Inclusion of a security in an index is not a recommendation to buy, sell or hold such security. No further distribution of FTSE Data is permitted without FTSE's express written consent.

Copyright MSCI. All Rights Reserved. Without prior written permission of MSCI, this information and any other MSCI intellectual property may only be used for your internal use, may not be reproduced or redisseminated in any form and may not be used to create any financial instruments or products or any indices. This information is provided on an "as is" basis, and the user of this information assumes the entire risk of any use made of this information. Neither MSCI nor any third party involved in or related to the computing or compiling of the data makes any express or implied warranties, representations or guarantees concerning the MSCI index-related data, and in no event will MSCI or any third party have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) relating to any use of this information. All MSCI returns information provided under license through MSCI. Any expected returns forecasted herein may be calculated by RA using data provided by MSCI Inc. No funds or securities relating to those expected returns forecasted herein are sponsored, endorsed or promoted by MSCI Inc., and MSCI bears no liability with respect to any such funds or securities.

RA is an investment adviser registered under the Investment Advisers Act of 1940 with the U.S. Securities and Exchange Commission (SEC). Our registration as an investment adviser does not imply a certain level of skill or training. RA does not offer or sell any securities, commodities or derivative instruments or products. Any such business may only be conducted through registered or licensed entities and individuals permitted to do so within the respective jurisdiction and only in conjunction with all legally required disclosure documents and regulatory filings. RA is not a broker-dealer and does not effect transactions in securities.

Notice to wholesale clients in Australia:

RA is exempt from the requirement to hold an Australian financial services license by operation of ASIC Class Order 03/1100: US SEC regulated financial service providers.

© 2023 Research Affiliates, LLC. All rights reserved. Duplication or dissemination prohibited without prior written permission.