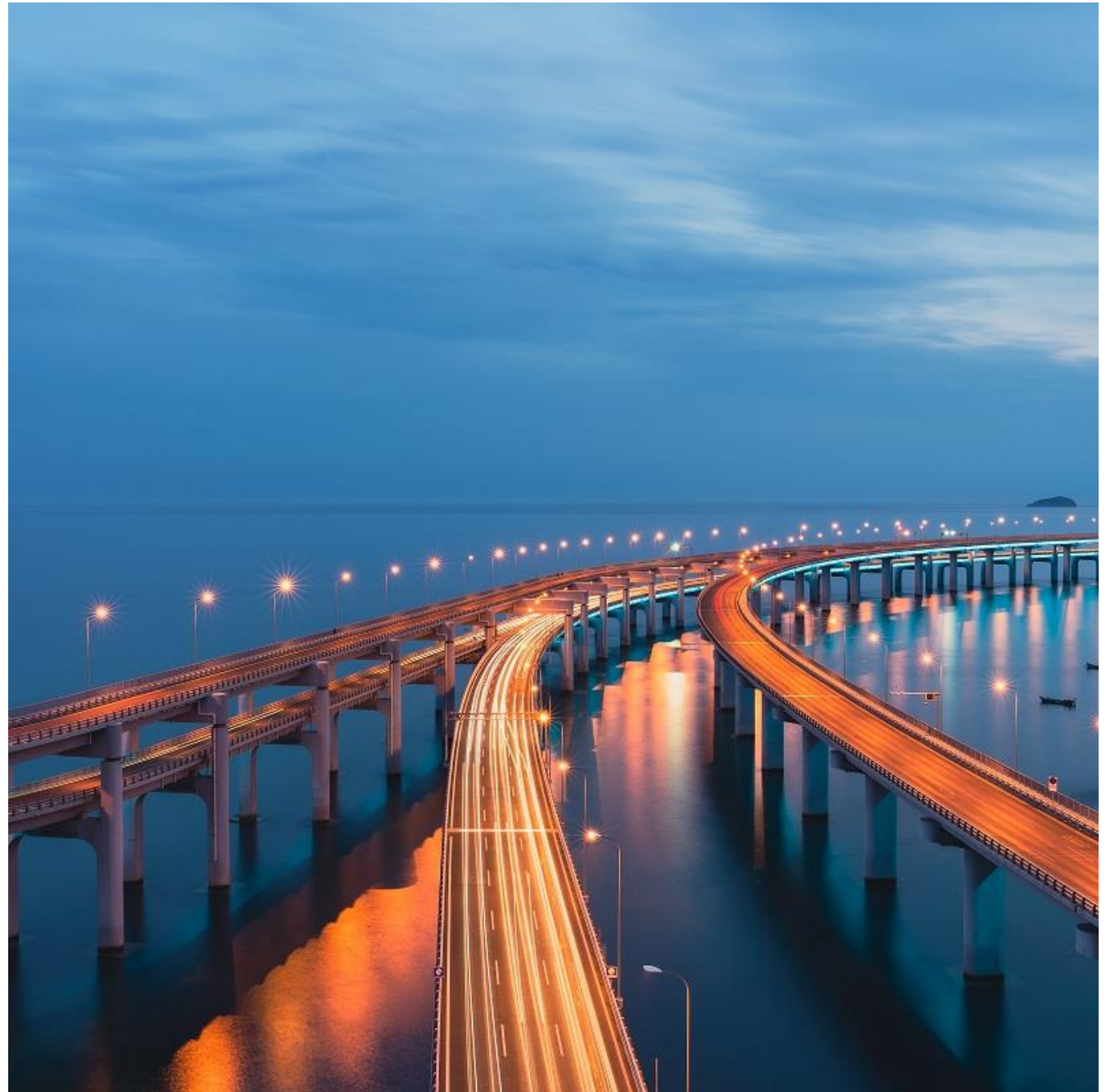


Futures Radio Show | May 2024

Four decades of Russell US Indexes Reconstitution

- How the Russell Indexes deliver an objective view of the ever-changing US equity market



Featured speakers

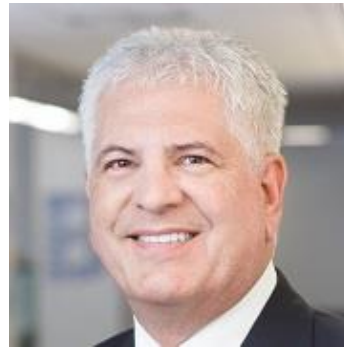
Industry experts from Cboe Global Markets, CME Group and FTSE Russell.



Indrani De, CFA, PRM
Head of Global
Investment Research
FTSE Russell



Catherine Yoshimoto
Director of Product
Management
FTSE Russell



Rick Rosenthal
Director, North
American Derivatives
Sales
Cboe Global Markets



Paul Woolman
Executive Director, Global
Head of Equity Index
Products
CME Group

Russell Reconstitution

Catherine Yoshimoto

Director of Product Management
FTSE Russell



Russell Indexes Annual Reconstitution

WHAT IS IT?

To accurately reflect the ever-changing equity markets, reconstitution is a complete recalibration of the Russell US indexes

Annual reconstitution maintains representation while minimizing unnecessary turnover

- 1 Breakpoints between large and small cap are adjusted
- 2 New and growing securities are captured
- 3 Investment styles are re-determined
- 4 Country assignments are reviewed

BENEFITS



Creates objective benchmarks by providing accurate, comprehensive representation of US equity markets and their market segments

Ensures that no distortions occur in the Russell US indexes due to size, country, or style bias

Index construction basics

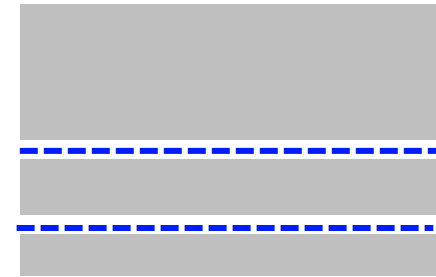
1 Identify eligible securities



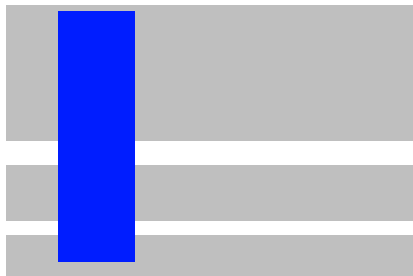
2 Rank eligible universe by market capitalization



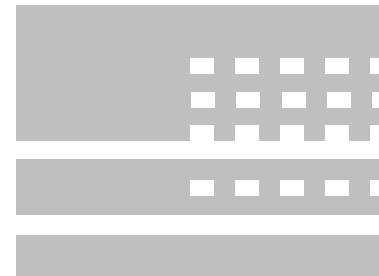
3 Apply cap breaks and banding



4 Determine Russell US Index membership



5 Adjust for float - Remove shares unavailable to investors



6 Determine style and stability weights



2024 Reconstitution calendar

April-ranking month

April is “ranking” month when the largest US companies are lined up to form the preliminary Russell US reconstitution portfolio. In 2024, the rank day falls on Tuesday, April 30.

May and June-transition months

May is the month that the preliminary reconstitution portfolio begins to be communicated to the marketplace. Beginning on **May 24**, preliminary lists are communicated to the marketplace and updates are provided on **May 31, June 7, June 14, June 21, and June 28**.

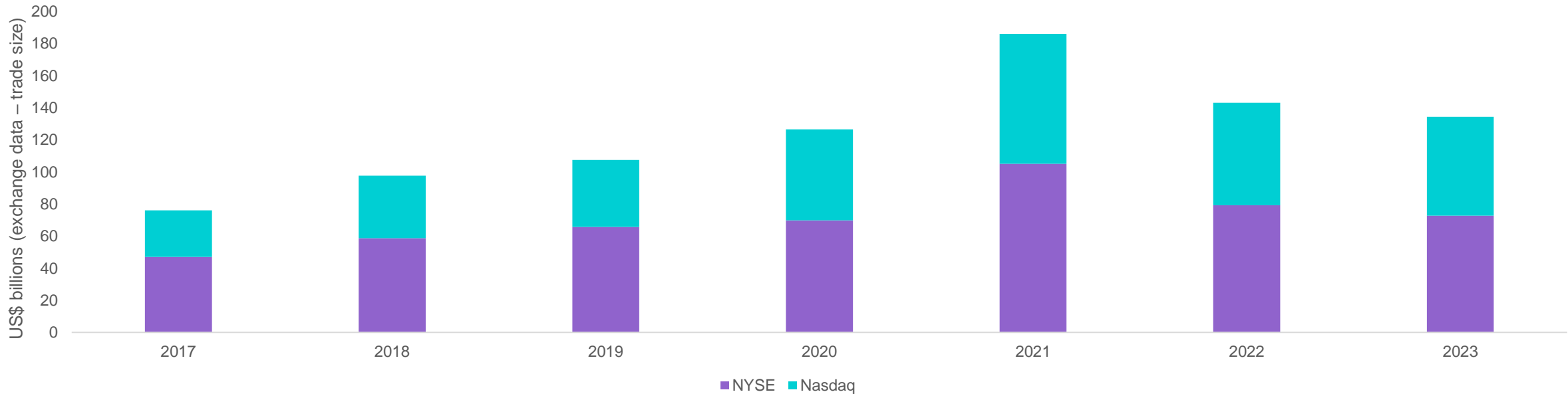
The newly reconstituted indexes take effect after the market close on **June 28**.

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|--------|---------|-----------|----------|--------|----------|
| 28 | 29 | 30 | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 1 | 2 | 3 | 4 | 5 | 6 |

Russell US Indexes

Annual Recon trade size in US\$ (June)

Approximately \$9 trillion is benchmarked to the Russell Indexes



| US\$ billions | June 2017 | June 2018 | June 2019 | June 2020 | June 2021 | June 2022 | June 2023 |
|---------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|
| NYSE | 47.1 | 58.7 | 65.7 | 69.9 | 105.1 | 79.3 | 72.7 |
| Nasdaq | 28.9 | 39.0 | 41.8 | 56.7 | 80.9 | 63.8 | 61.7 |
| Total | 76.0 | 97.7 | 107.5 | 126.6 | 186.0 | 143.1 | 134.4 |

Source: FTSE Russell, NYSE, and Nasdaq, as of June 2023.

Data as of December 31, 2022 as reported on April 1, 2023 by eVestment for active institutional funds, Morningstar for active retail mutual funds, insurance products, and ETFs, and passive assets directly collected by FTSE Russell. AUM includes blended benchmarks and excludes futures and options. AUM data does not include active and passive assets not reported to a 3rd party source or FTSE Russell. For funds where the AUM was not reported as of December 31, 2022, the previous period AUM was used as an estimate. No assurances are given by FTSE Russell as to the accuracy of the data.



Russell 2024 Recon

A Macro and US Equity Market Overview

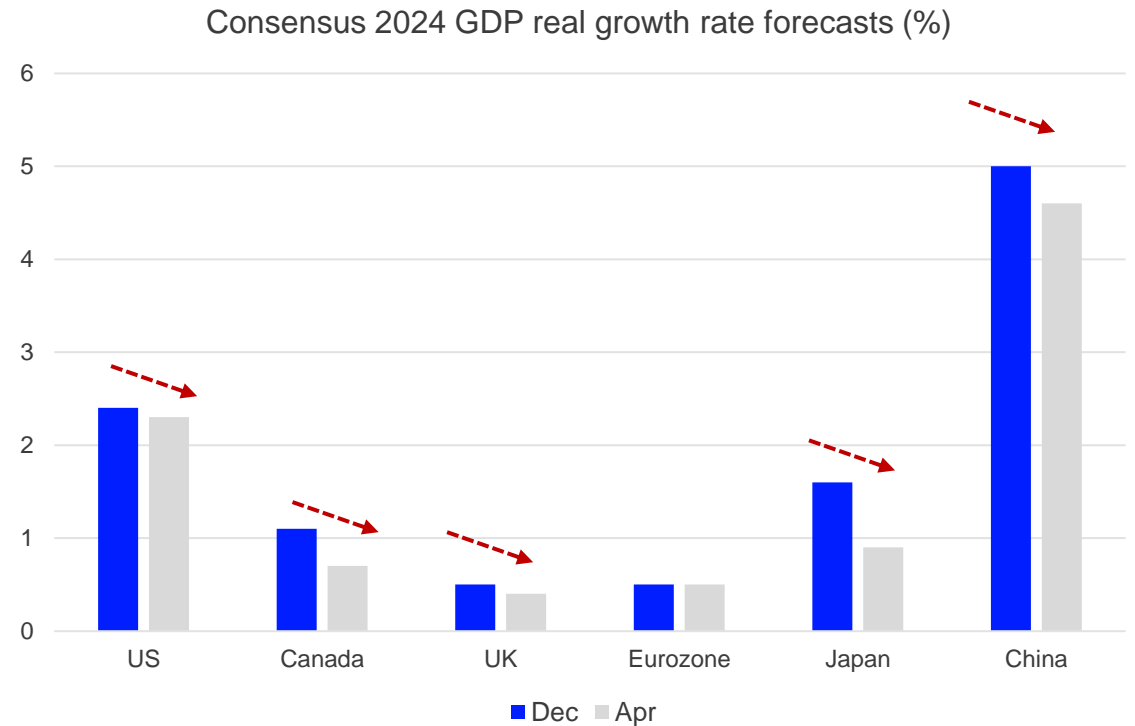
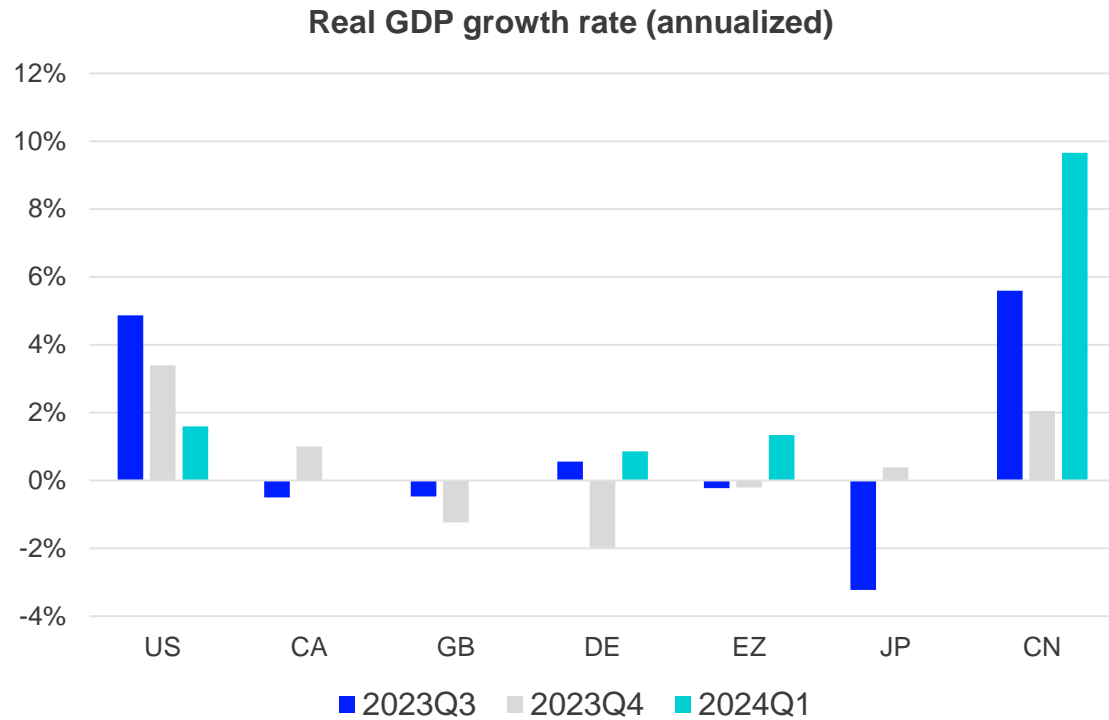
Indrani De, CFA, PRM
Head of Global Investment Research
FTSE Russell

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Views expressed are subject to change. These views do not necessarily reflect the opinion of FTSE Russell or London Stock Exchange Group plc.

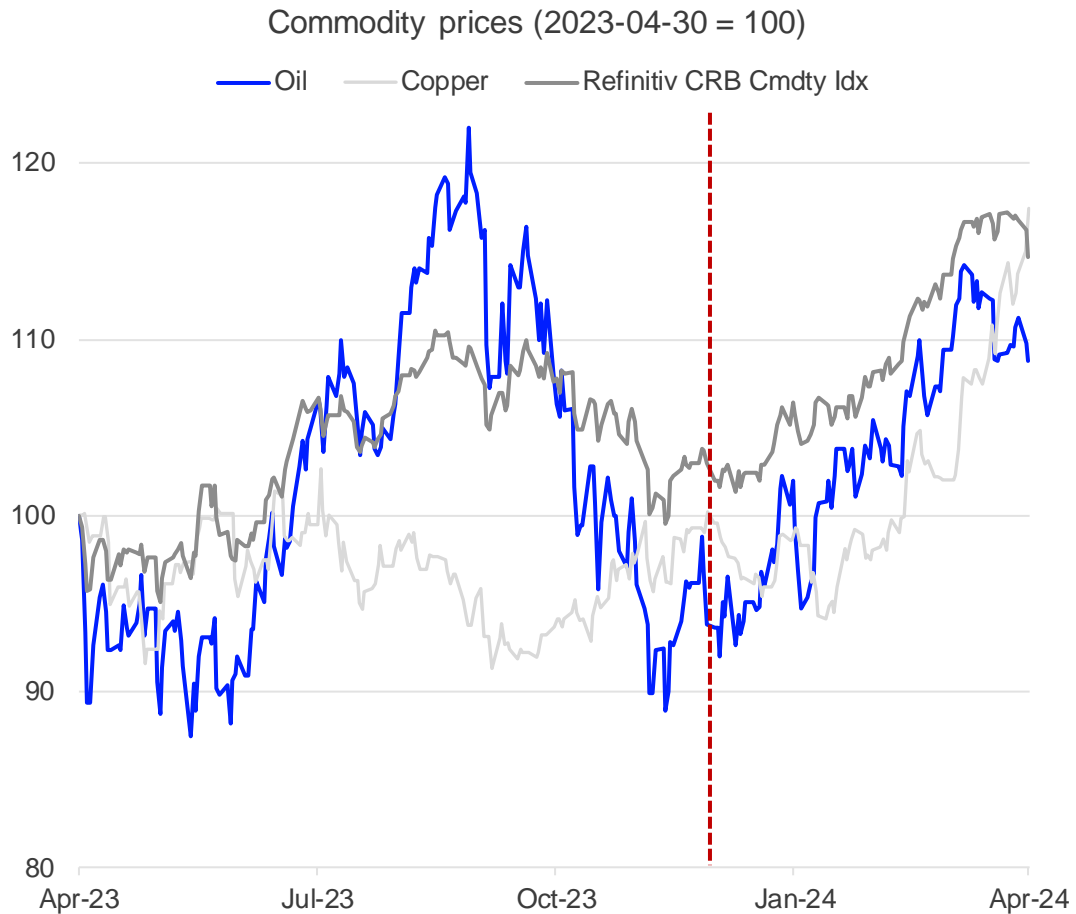
Macro: Growth

Growth has been higher in the US than in Europe, but growth expectations have generally dropped since beginning of the year



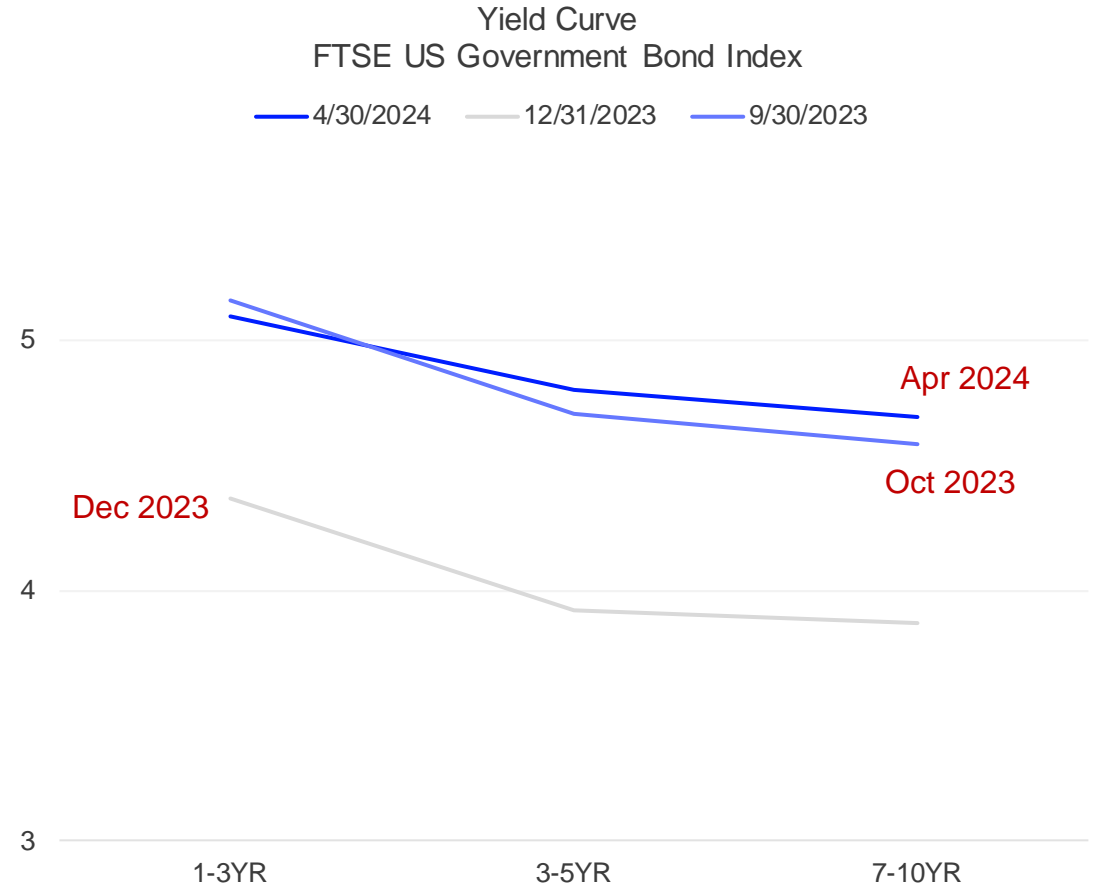
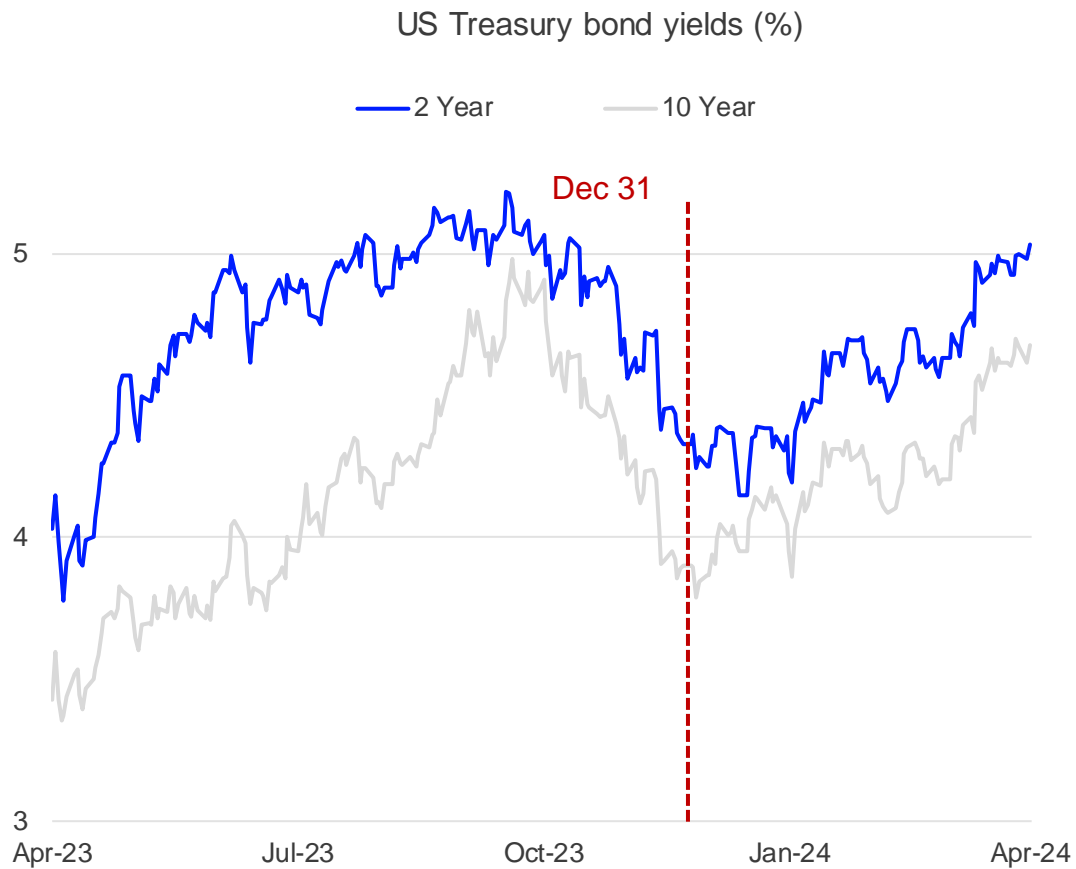
Macro: Inflation expectations

Oil prices bounced back pushing the commodity index higher. Break-even inflation rates also bounced back, well above 2% target



Despite the Fed being on hold since July, yields have moved significant since then

Rise in rates in 2024 erased drop seen in Q4



12M performance of the US Equities & All-world ex US

Russell 1000 vs All-World ex US Indexes (USD, TR, Rebased)

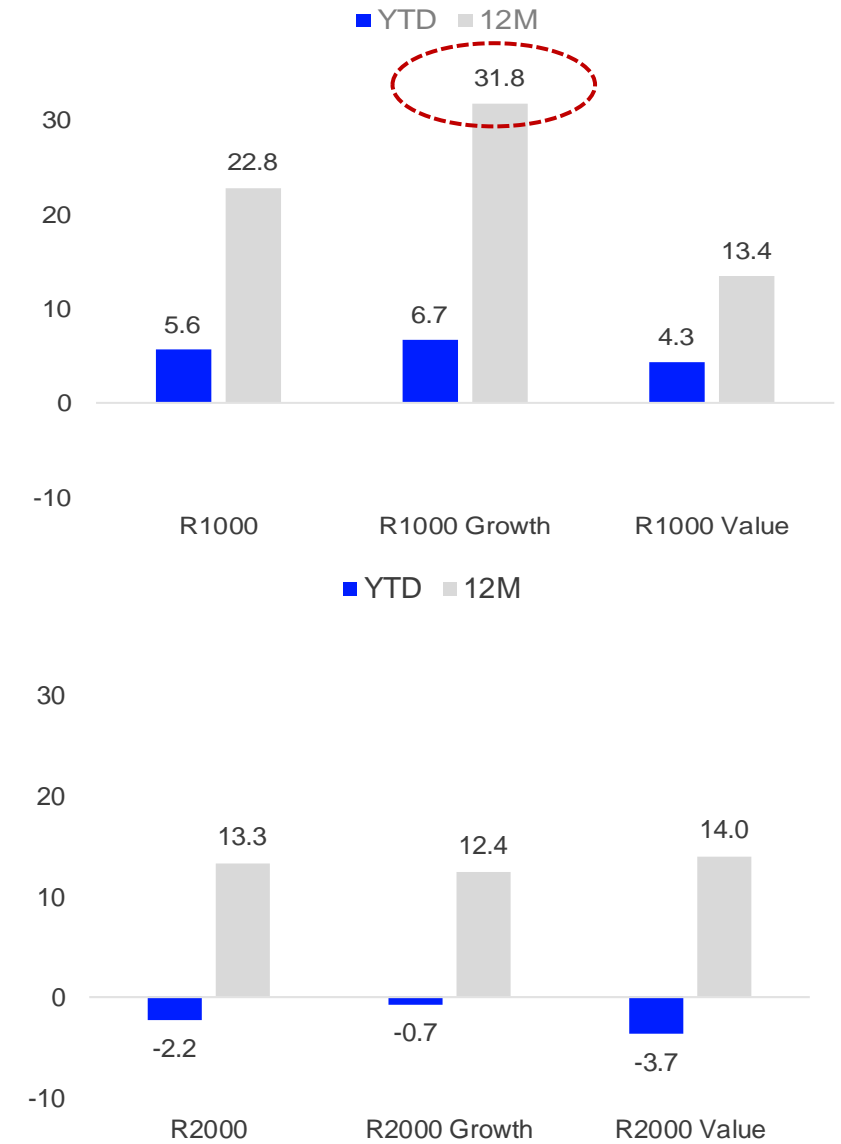


US equity markets have rallied strongly since November

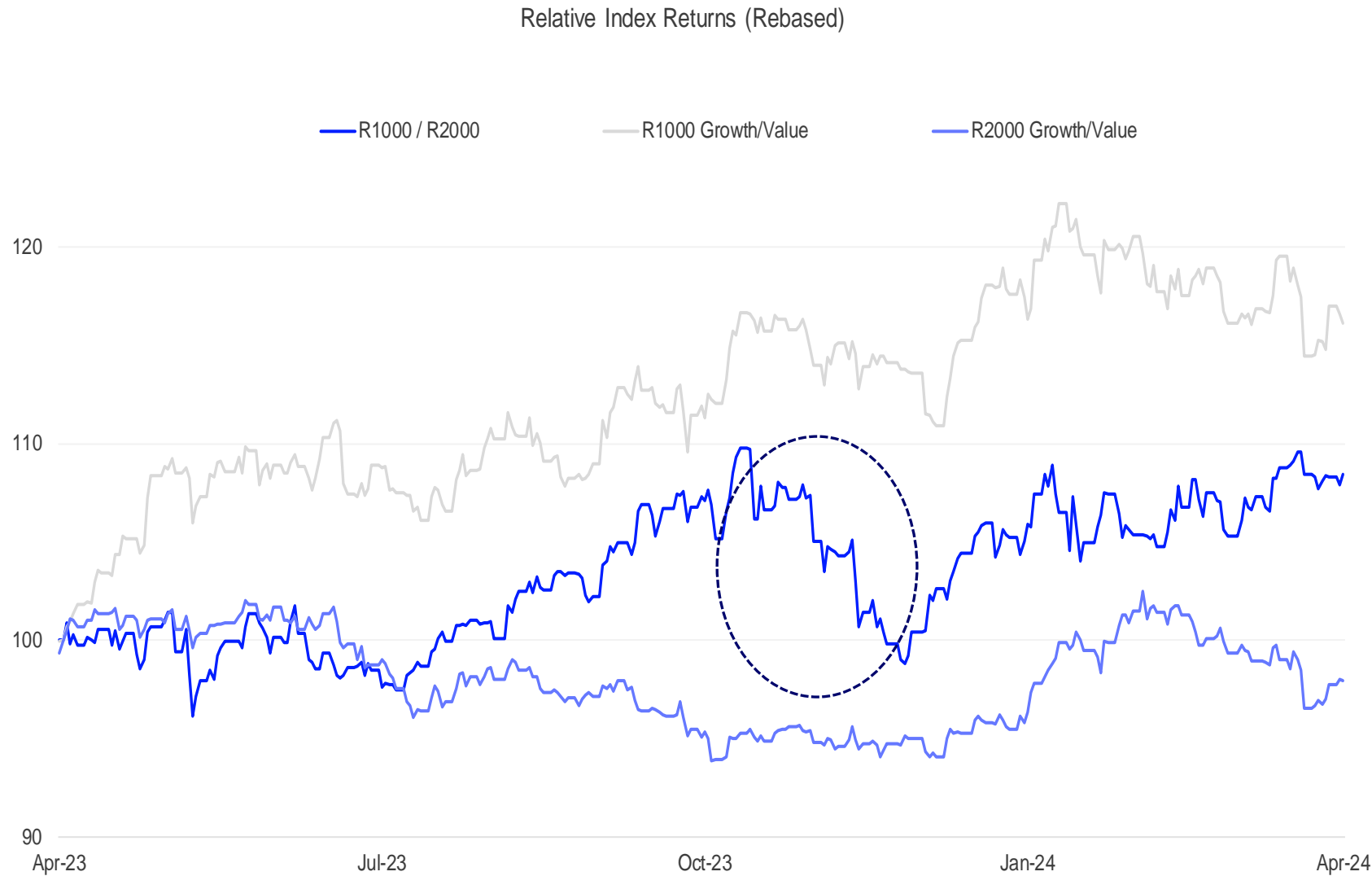
Large cap Growth was the clear winner for the 12-month period



Index returns (USD, %)



The biggest effect was from Growth outperforming Value within the large cap Russell 1000



Last 12-months can be broken up into several phases:

Tail end of the AI rally with large cap Growth leading the way but small caps participating.

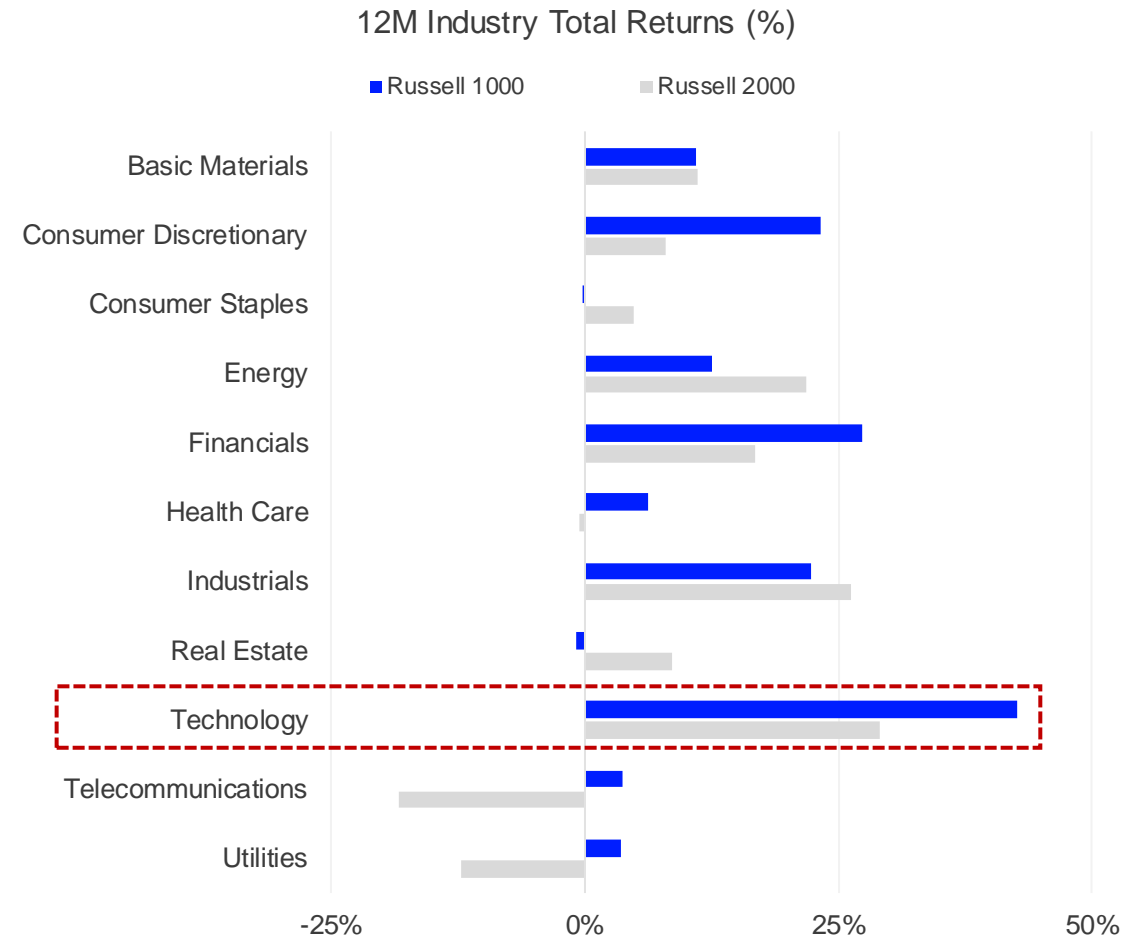
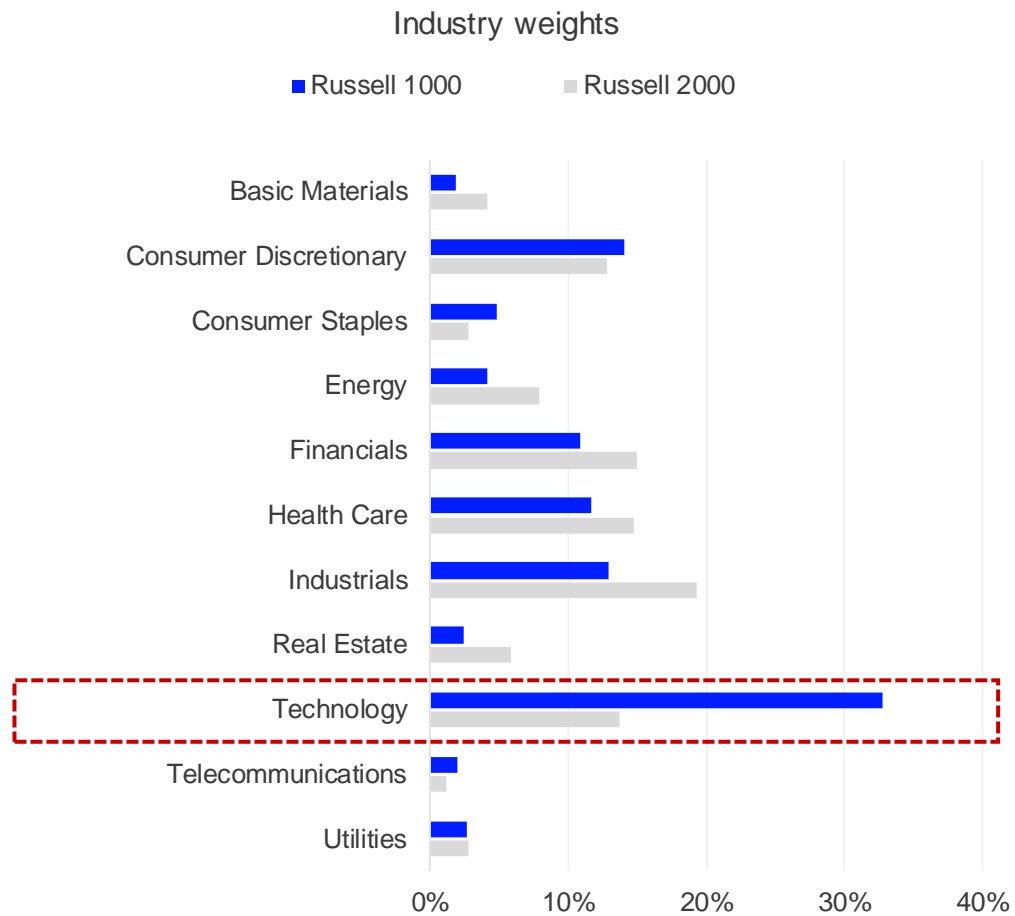
General pull back with Russell 2000 selling off more than Russell 1000.

Catch up rally in Nov. – Dec. with small caps rallying strongly.

Continuation of the general rally but with large cap Growth again taking the lead.

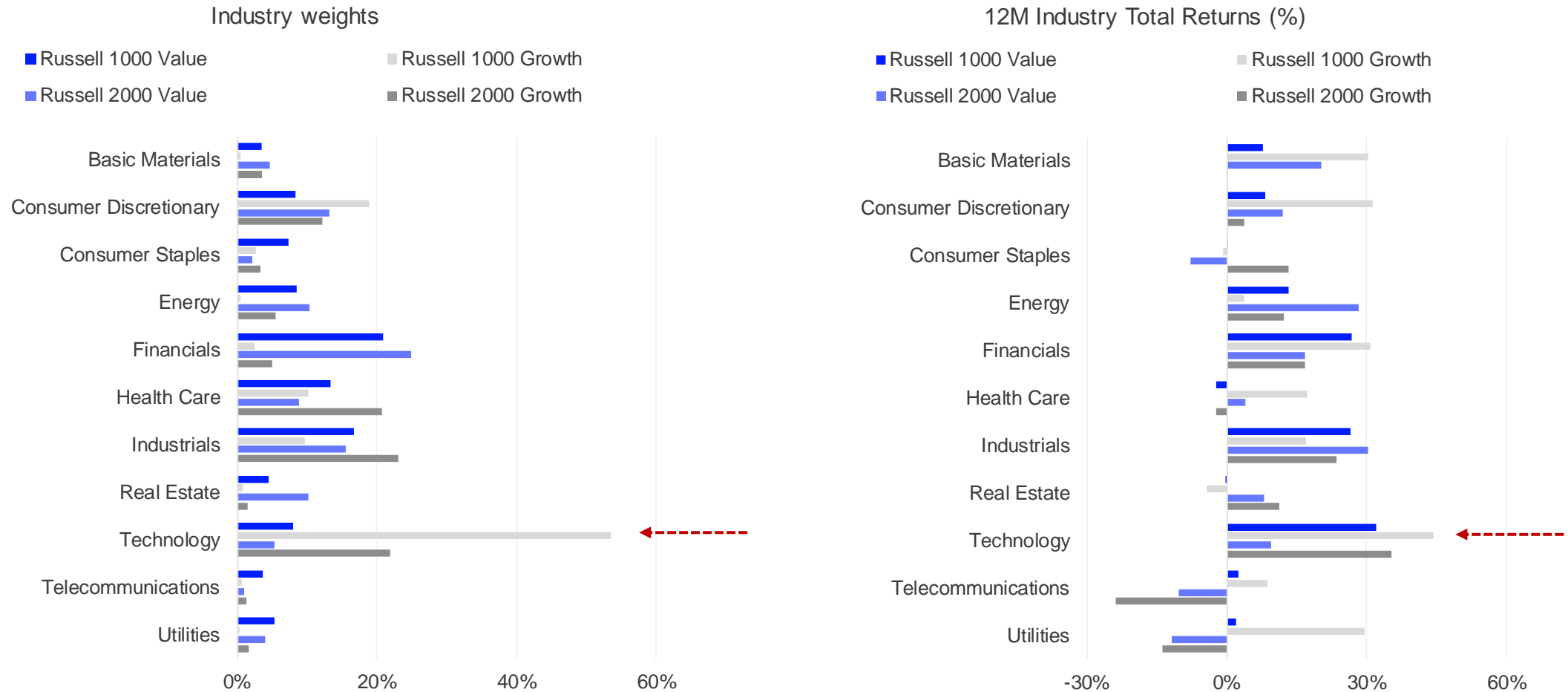
Technology was the best performing industry in both large and small caps

The large Tech weight in the Russell 1000 led to concentrated performance within the large cap index



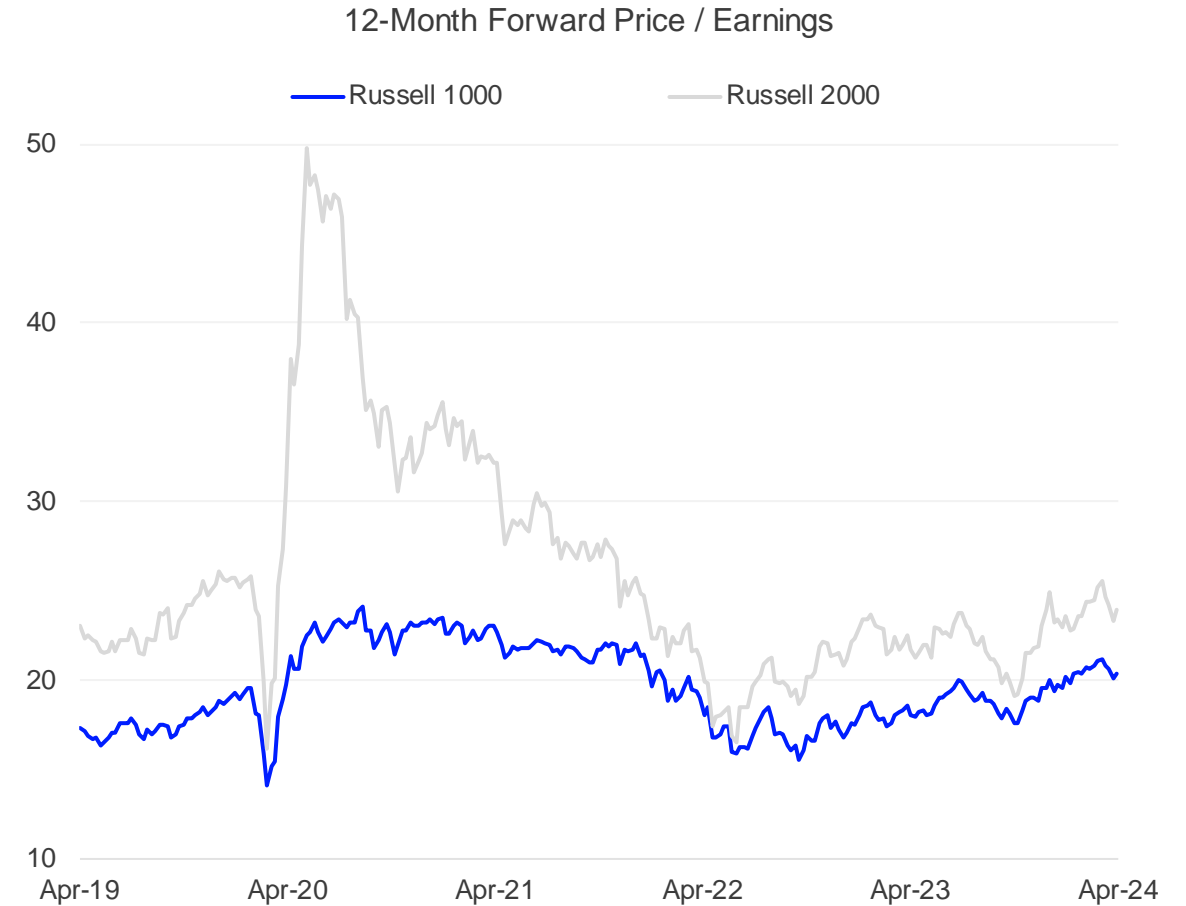
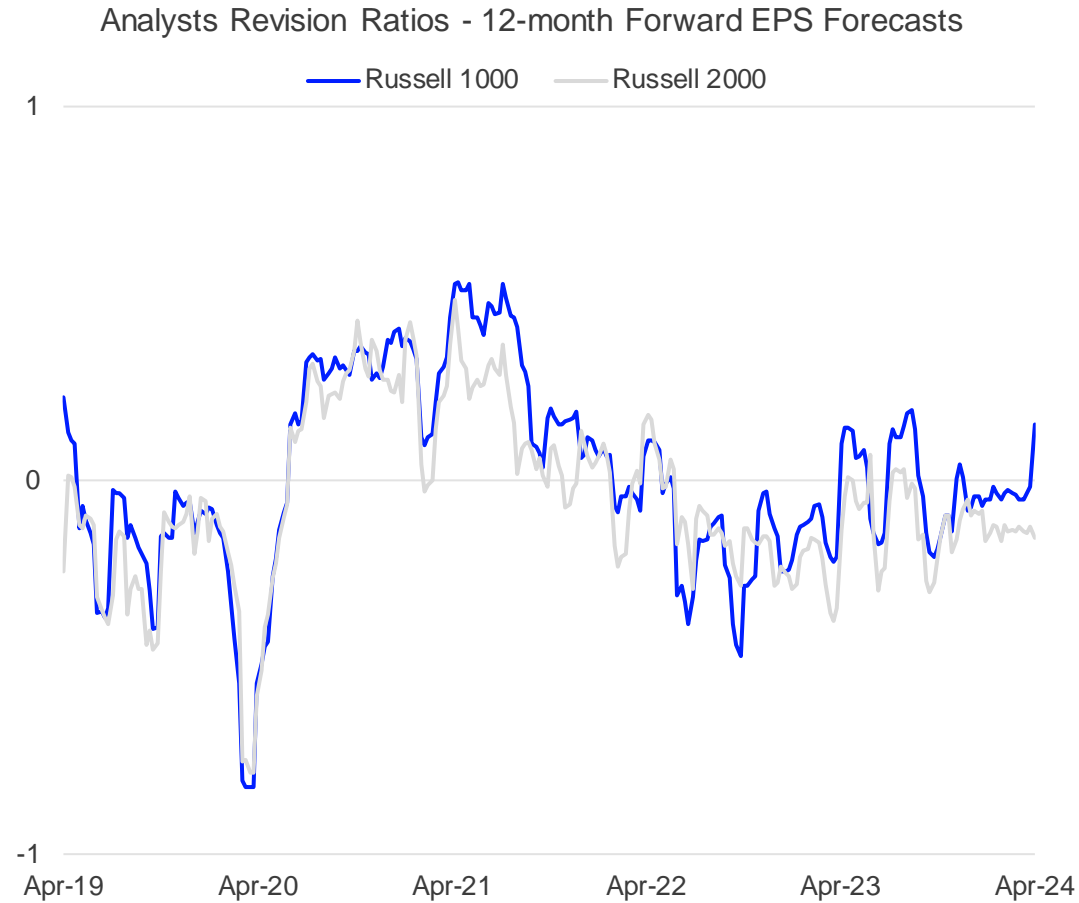
The Tech concentration was even stronger in Russell 1000 Growth

Small cap Telecom and Utilities dragged down the Russell 2000

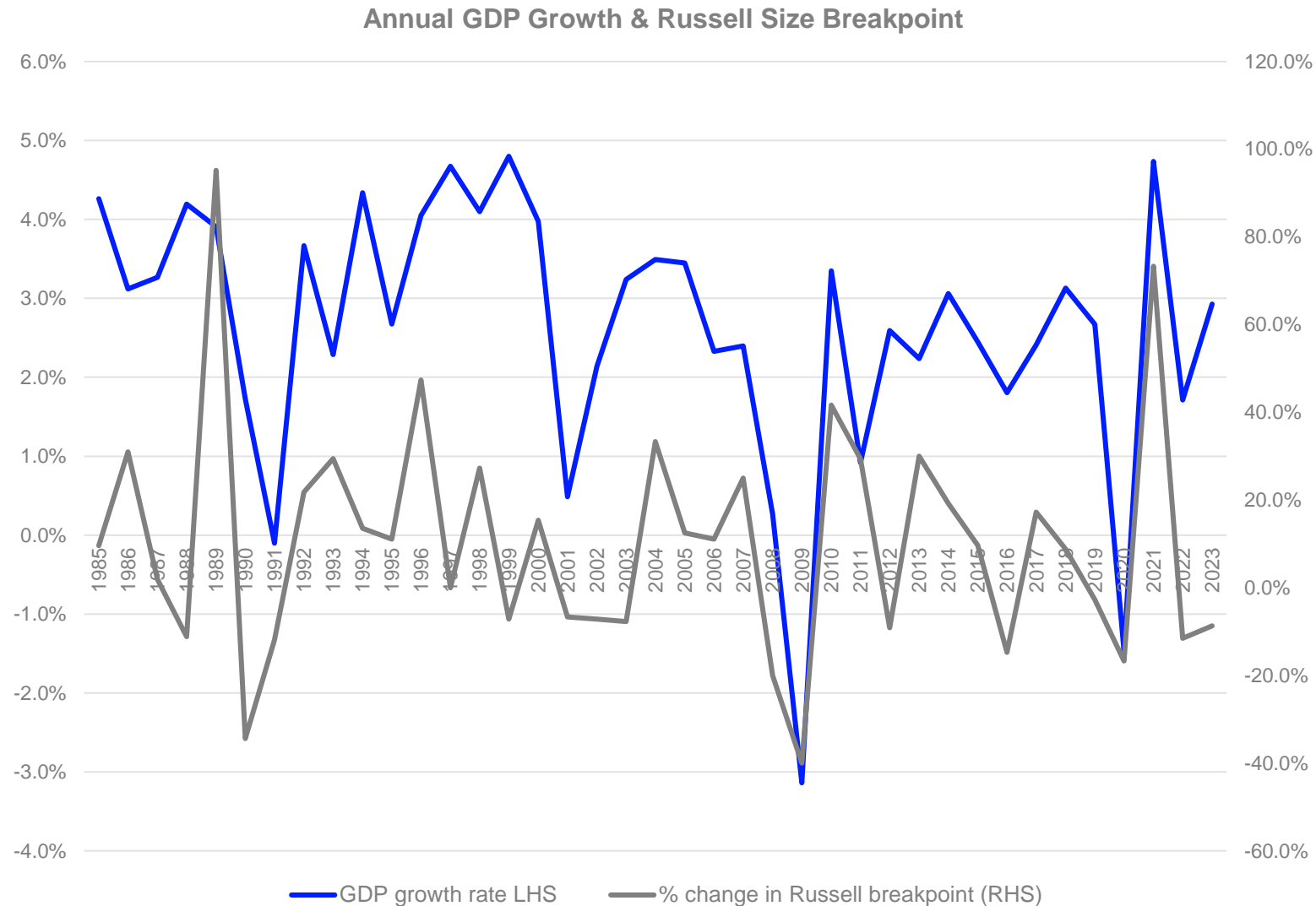


Earnings revisions continue to be neutral for the Russell 1000 and slightly negative for the Russell 2000

Both Russell 1000 and Russell 2000 forward PEs moved up since the rally started in November



Russell reconstitution...reflective of the underlying US economy?



| Period | Correlation |
|-----------|-------------|
| 1985-2023 | 52% |
| 2000-2023 | 68% |
| 2007-2023 | 71% |

The relationship between the real economy and Russell index breakpoints has been historically strong and the correlation grew stronger over time.

This reflects that the index methodology changes being value additive in terms of tracking changes in economic growth more closely.

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Futures Radio: Russell Reconstitution

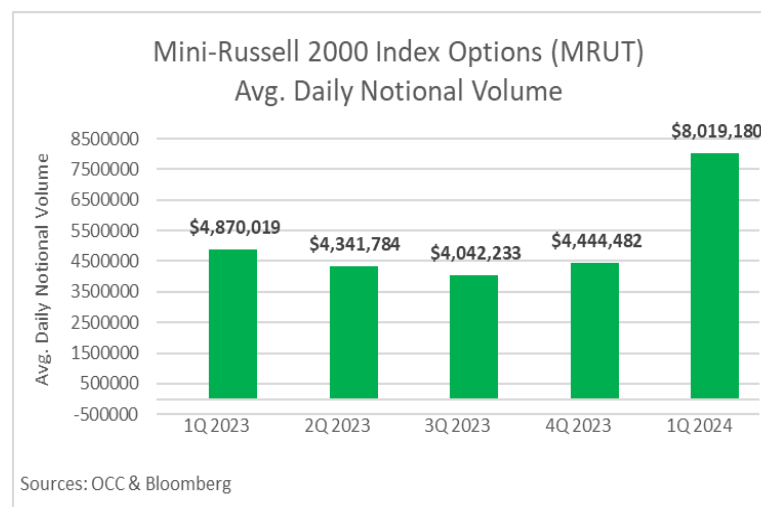
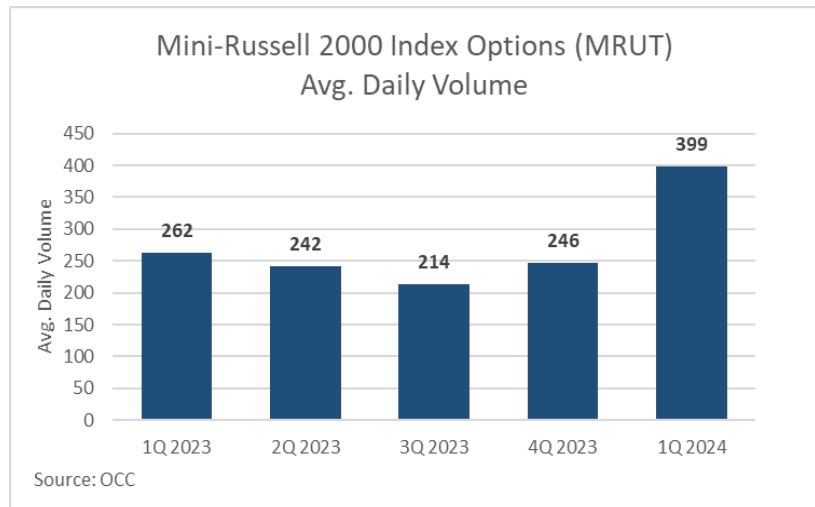
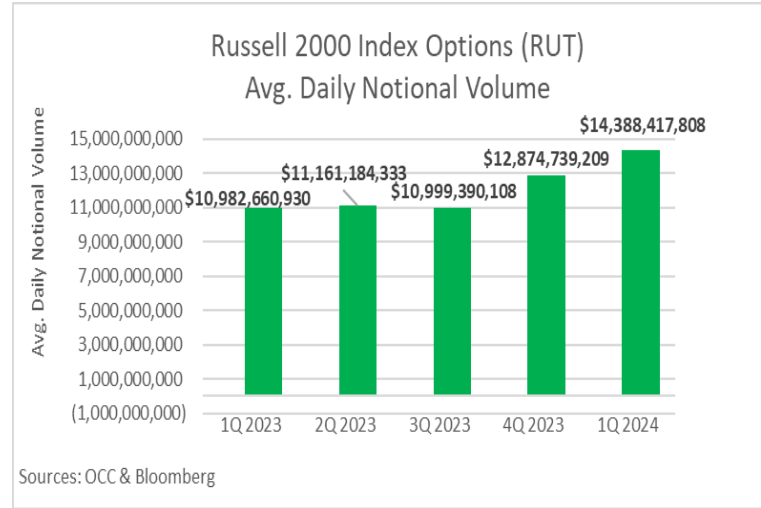
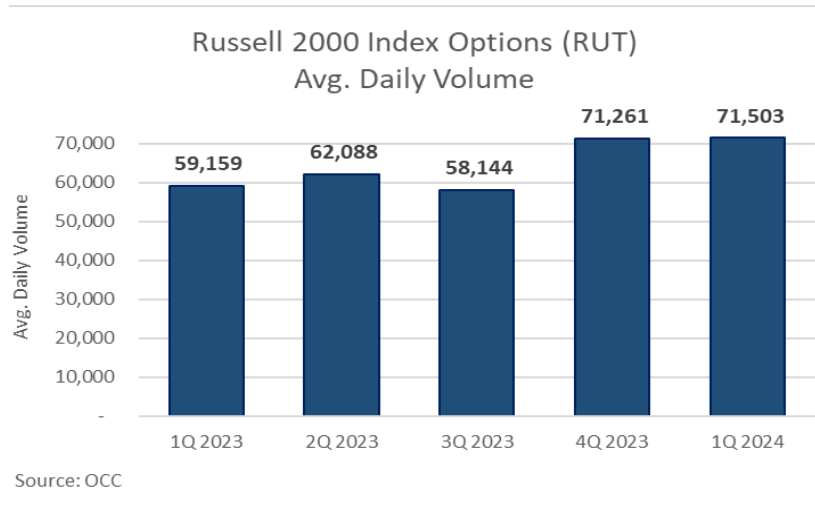
Rick Rosenthal, Director, North American Derivatives Sales

rrosenthal@cboe.com



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Russell 2000 Index Options Volume Growth



Volume Growth Q1 2024 vs 2023

- On January 8, 2024 Cboe introduced Tuesday & Thursday expirations on Russell 2000 Index options (RUTW & MRUT)
- RUT Q1 '24 vs Q1 '23 – Total Avg. Daily Volume @ 71,500 **(+21%)**
- RUT Q1 '24 vs Q1 '23 – Total Avg. Daily Notional \$14 bln **(+31%)**
- MRUT Q1 '24 vs '23 – Total Avg. Daily Volume @ 399 **(+52%)**
- MRUT Q1 '24 vs '23 – Total Avg. Daily Notional \$8 mln **(+65%)**

What's Unique About the Russell 2000 Index?



Factors Affecting Index Performance:

- Industrial Sector Weightings
- Revenues Primarily from Domestic Business Activity
- Interest Rate Sensitivity
- Price Volatility

| Russell 2000 Index | |
|------------------------|------------|
| Sector Weightings | Percentage |
| Industrials | 19% |
| Health Care | 15% |
| Financials | 15% |
| Information Technology | 14% |
| Consumer Discretionary | 13% |
| Energy | 8% |
| Real Estate | 6% |
| Basic Materials | 4% |
| Consumer Staples | 3% |
| Utilities | 3% |
| Telecommunications | 1% |

| Russell 1000 Index | |
|------------------------|------------|
| Sector Weightings | Percentage |
| Information Technology | 33% |
| Consumer Discretionary | 14% |
| Industrials | 13% |
| Health Care | 12% |
| Financials | 11% |
| Consumer Staples | 5% |
| Energy | 4% |
| Utilities | 3% |
| Real Estate | 2% |
| Telecommunications | 2% |
| Basic Materials | 2% |

Russell 2000 Index and the Market's Expected Volatility

RVX Index The Cboe Russell 2000 Volatility Index (RVXSM) is a gauge designed to be an up-to-the-minute market estimate of expected 30-day future volatility of the Russell 2000® Index and is calculated by using the midpoint of real-time Russell 2000 Index (RUT) option bid/ask quotes. The RVX Index is not investable.

Negative Correlation

Correlation of daily changes in RUT & RVX

-0.71

All-time Daily Closing High

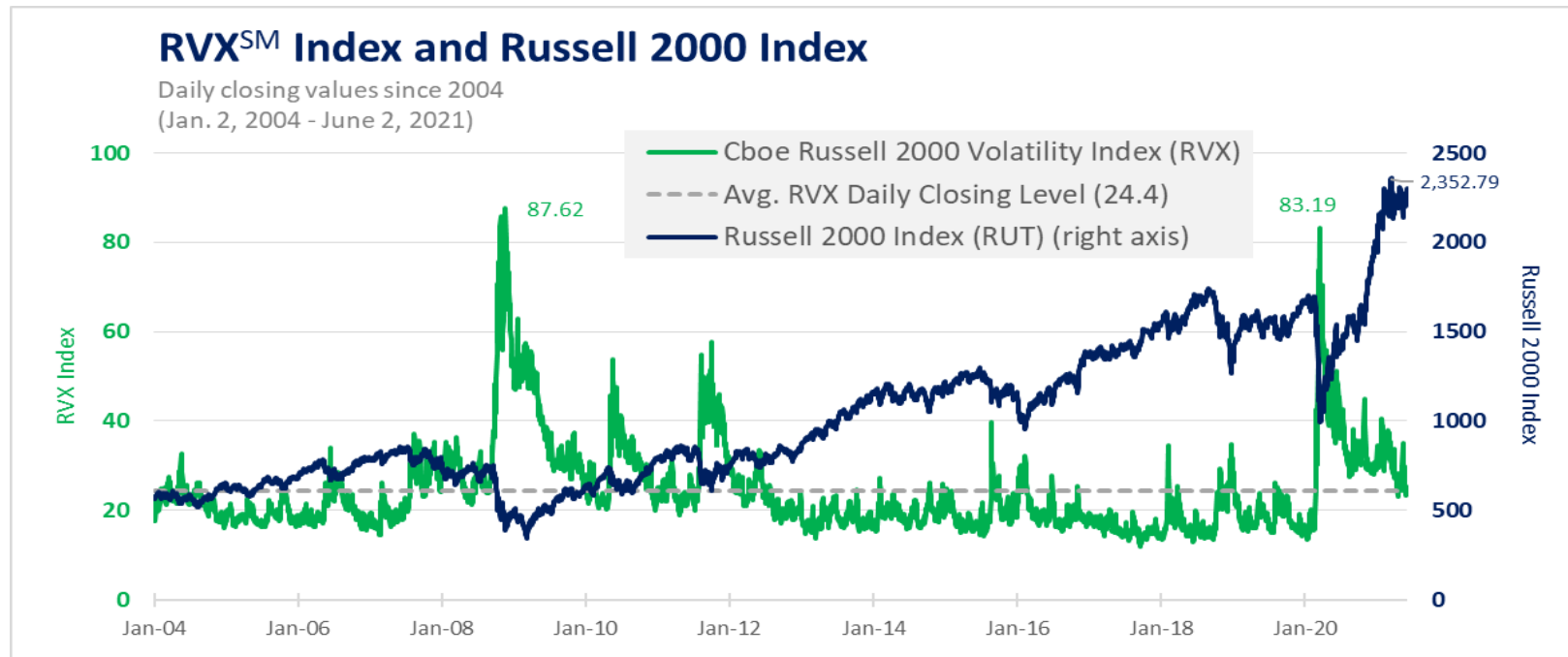
RVX hit its high on Nov. 20, 2008

87.62

Biggest One-Day % Move

RVX Index rose on Feb. 5, 2018

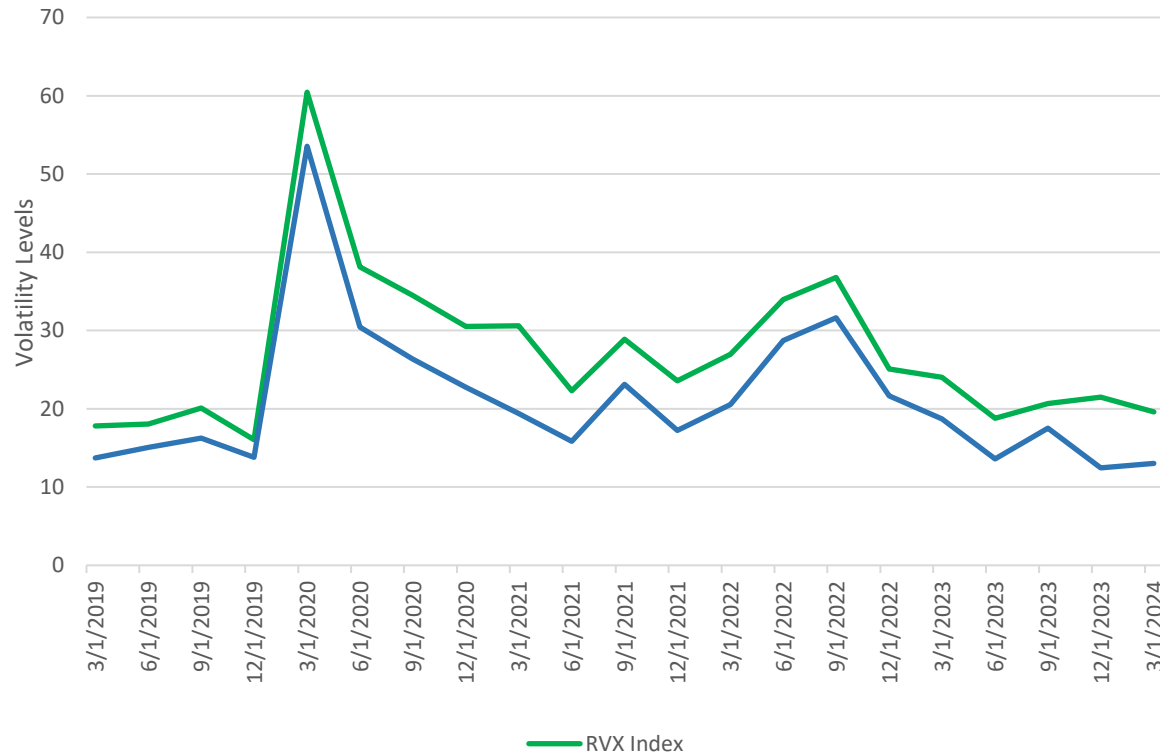
Up 71.7%



Sources: Bloomberg and Cboe Global Markets.

Russell 2000 Index Volatility Premium

30-Day Expected Volatility Comparisons
RVX Index - VIX Index
(2019 - 2024)

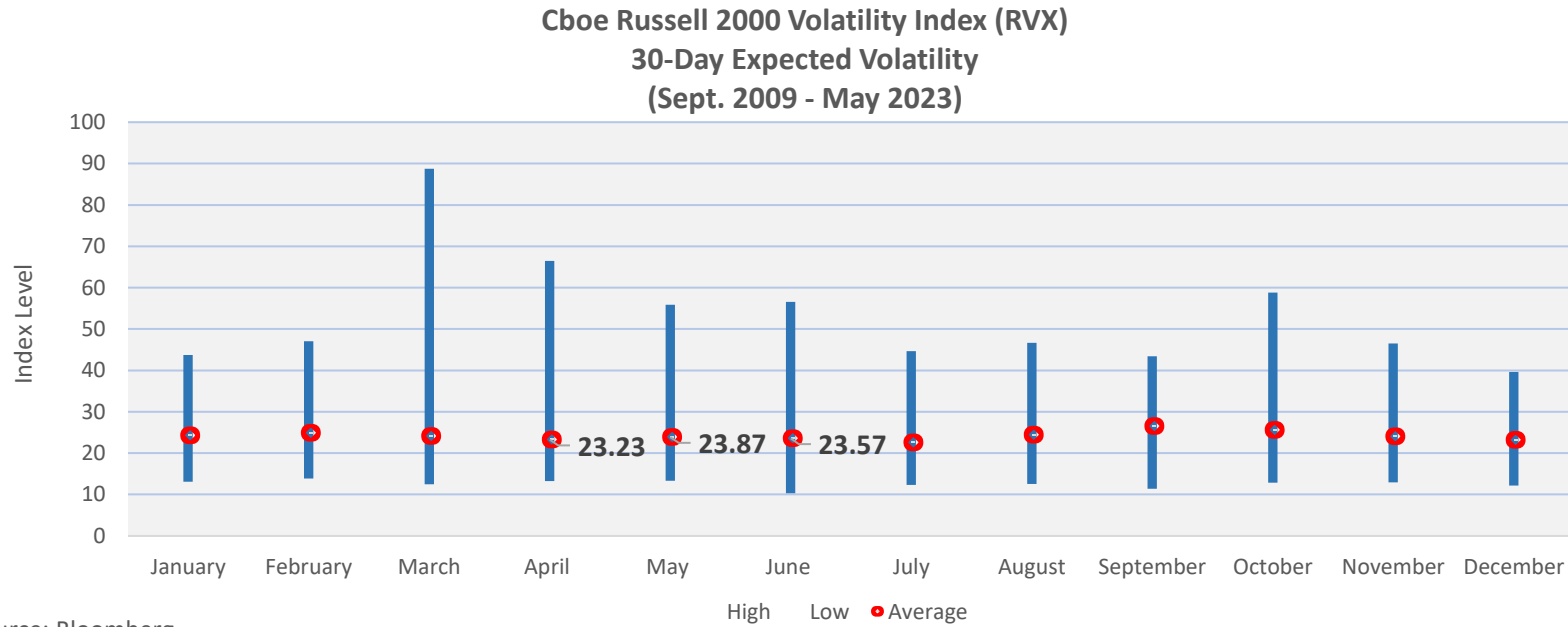


Source: Bloomberg

Average 30-Day Expected Volatility

- RVX Index 27.06 vs VIX Index 21.21
- Russell 2000 30-Day expected volatility carries a 6% higher volatility level compared to the S&P 500.
- Options-based strategies used to harvest volatility i.e. BuyWrite, Cash-secured PutWrites, Iron Condors, Credit Verticals, etc. may find opportunities may benefit from Russell 2000 higher volatility regime.

Selected Option Writing Strategies – Russell Recon.



Source: Bloomberg

Russell Recon. Period

| | 6/12 - 6/26 | 5/27 - 6/24 | 5/12 - 6/23 | 5/11 - 6/22 | 5/10 - 6/28 | 5/8 - 6/26 | 5/7 - 6/25 | 5/6 - 6/24 | 5/19 - 6/23 |
|-------------|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|-------------|
| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| RUT | 1.17% | -1.99% | 2.32% | 4.90% | -0.41% | 3.70% | 2.76% | -4.01% | 2.70% |
| PUTR | 0.13% | -0.34% | 2.36% | 1.56% | 2.69% | 4.21% | 5.03% | -1.29% | 1.33% |
| BXR | 0.17% | -0.82% | 2.70% | 1.73% | 3.10% | 5.24% | 4.37% | -3.87% | -0.23% |
| BXRD | 0.60% | -0.75% | 3.02% | 2.99% | 0.81% | 2.66% | 3.32% | -3.98% | 0.56% |

Russell 2000 Index (RUT)

Cboe Russell 2000 BuyWrite Index (BXR)

Cboe Russell 2000 PutWrite Index (PUTR)

Cboe Russell 2000 30 Delta BuyWrite Index (BXRD)

Cboe Options Education

To learn more about options-based strategies please visit Cboe's website www.cboe.com:
Options Institute Webinars - Practitioner's Perspectives: Options Strategies

Derivatives Market Intelligence – Mandy Xu, Vice President, Head of Derivatives Market Intelligence insights and analysis.

Insights – Guest Author Blog Series

Cboe's Risk Management Conference (RMC) 2024 hosted in Snowbird, Utah (Oct. 15 – 18)
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Russell 2000 Reconstitution Presentation

May 2024

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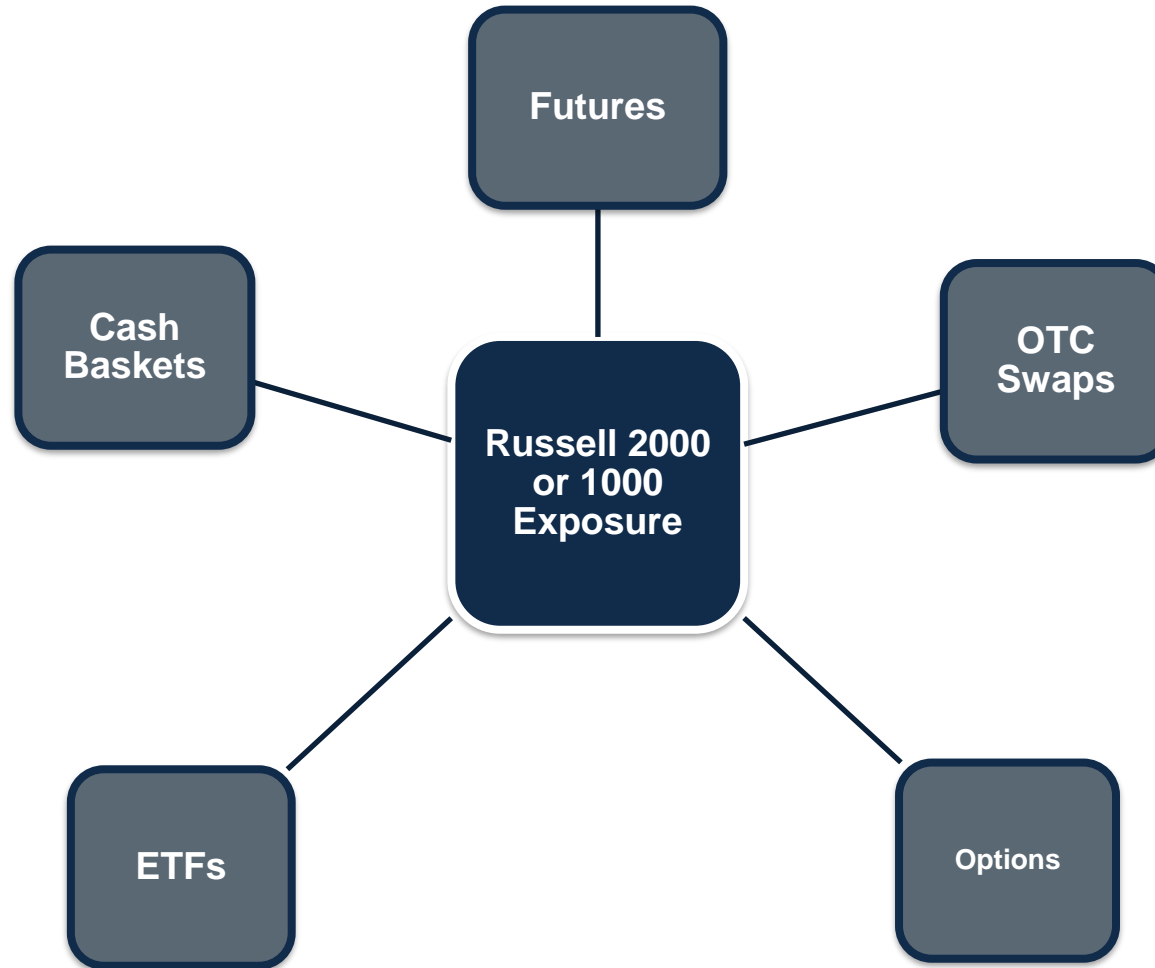
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E-mini Russell 2000 Futures at CME Group

Execution Methods for Obtaining U.S. Equity Index Exposure



Vehicle Comparison

| | Advantages | Disadvantages |
|----------------------|--|--|
| Cash Baskets | <ul style="list-style-type: none"> • Not classified as a “derivative” • Voting rights retained • No management fees vs. ETFs | <ul style="list-style-type: none"> • More complex implementation to track benchmarks (market data costs) • Potentially higher implementation costs vs. ETFs and futures • Less capital efficiency vs. derivatives |
| Index Futures | <ul style="list-style-type: none"> • Highly capital efficient • Liquid and transparent • Immediate access to positive variation margin • Cheap beta. Low tracking error • Near 24-hour access to liquid, electronic market | <ul style="list-style-type: none"> • Required to roll • Not always block eligible • Cannot be traded in a securities account |
| ETFs | <ul style="list-style-type: none"> • Single instrument in a securities account • Numerous product choices, increasingly providing access to more granular and alternative exposure (e.g. volatility) • Dealers can offer price guarantees and flexible order types/executions | <ul style="list-style-type: none"> • Management fee • Difficult to short (locate required) • Higher margin, capital intensive • Explicit financing with lower leverage • Explicit disclosure (for ‘40 Act funds) • Dividend withholding tax (participant-specific) |
| OTC Swaps | <ul style="list-style-type: none"> • Very flexible underlying exposure • Can mitigate roll risk and dividend risk • High-leverage/Non-funded (clients) • Dealers can offer price guarantees on index swaps and flexible order types | <ul style="list-style-type: none"> • Direct counterparty credit risk • Onerous documentation (ISDA, CSA, etc.) • Operationally difficult • Limited number of participants • Regulatory uncertainty |
| Index Options | <ul style="list-style-type: none"> • Highly capital efficient • Tax friendly (participant specific) • Liquid and transparent | <ul style="list-style-type: none"> • Only exist on major benchmarks • Higher touch (cash index options) |

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Since FTSE Russell returned in 2015, CME Group has collaborated to introduce new and exciting product innovations to help futures become more capital and operationally efficient

2015: CME and FTSE Russell announce partnership

Jul 2017: E-mini Russell 2000 Futures and Options return to CME Group

Dec 2018: CME launches Total Return Futures on Russell 2000 and Russell 1000 indices

May 2019: CME launches Micro E-mini Russell 2000 Futures

Apr 2020: CME launches TACO on Russell 2000 Futures based on the success of BTIC

Apr 2022: CME launches E-mini Russell 2000 Annual Dividend Index Futures

Oct 2022: CME launches E-mini Russell Monday & Wednesday Options

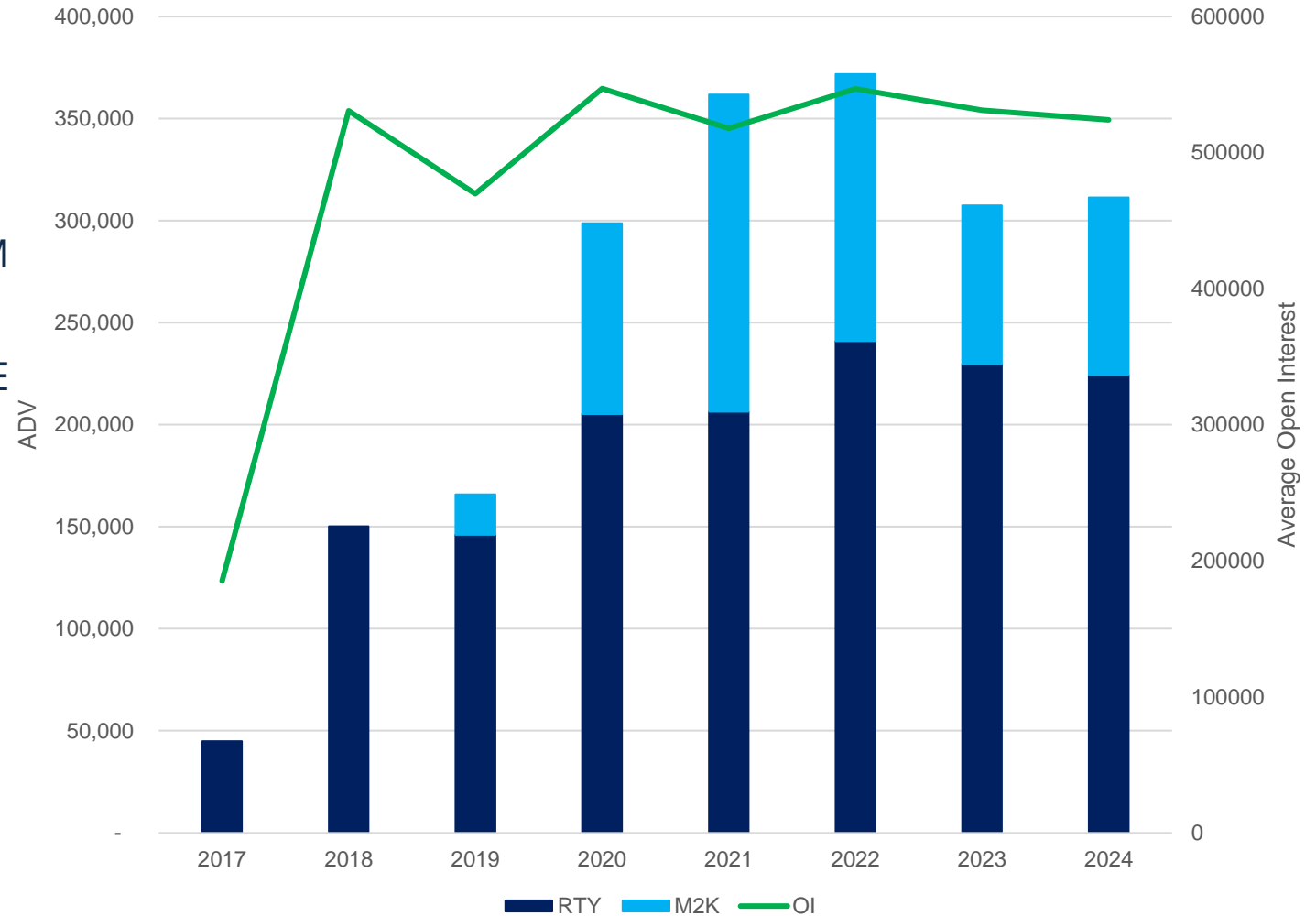
Feb 2023: CME launches E-mini Russell Tuesday & Thursday Options

Jul 2023: CME launches TMAC (Trade Marker at Close) on E-mini Russell Futures

E-mini Russell 2000 Index Futures and Options

- E-mini Russell 2000 Futures have averaged 224K contracts per day in 2024 (\$22.5B notional)
- Micro E-mini Russell 2000 Futures have averaged 87K contracts per day in 2024 (\$876M notional)
- Relative to adjacent Russell 2000 markets, CME continues to perform strongly. In Q1-2024 RTY futures have traded 3.0x and 0.4x higher than the ETP and cash markets
- E-mini Russell 2000 Options had a record volume day of 39,834 on December 14th, 2023.
- Notional Values of Each Contract as of May 2024:
 - RTY: \$103,000
 - M2K: \$10,300

Russell 2000 Futures ADV and Average Open Interest



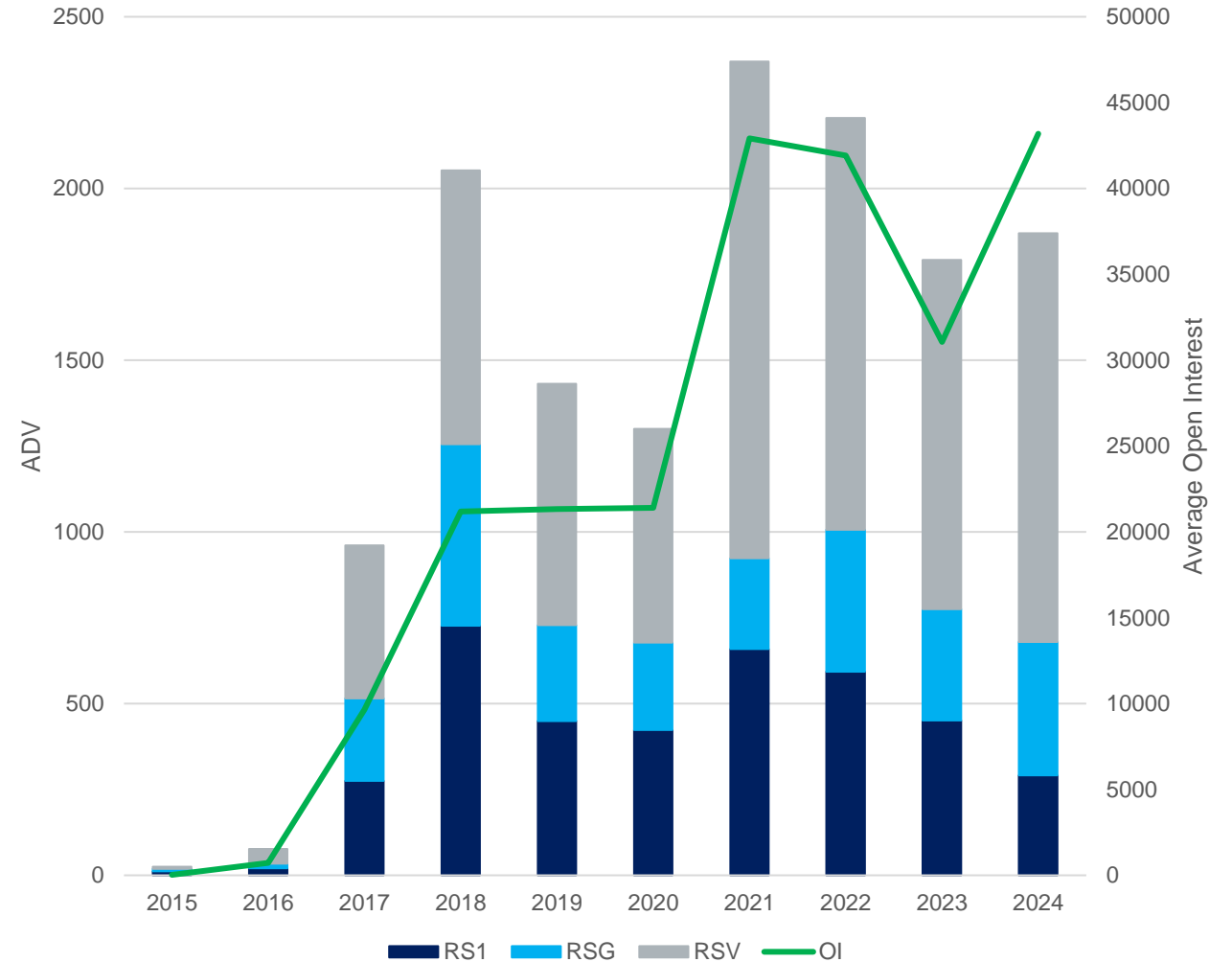
Data Source: CME Group as of May 18, 2023

E-mini Russell 1000 Index Futures

- ADV since launch has been ~1,400 contracts, with ADV in Q1-2024 averaging 1.9K contracts
- There has been a shift in how Russell 1000 futures products have been transacted at CME Group, with a clear shift to BTIC and Block products:

| Year | Globex | BTIC (Block & Globex) | Block |
|------|--------|-----------------------|--------|
| 2015 | 95.71% | 0% | 4.29% |
| 2016 | 100% | 0% | 0% |
| 2017 | 55.12% | 7.37% | 37.51% |
| 2018 | 69.73% | 7.80% | 22.47% |
| 2019 | 83.28% | 16.61% | 0.11% |
| 2020 | 68.92% | 31.08% | 0% |
| 2021 | 30.39% | 21.07% | 46.46% |
| 2022 | 31.94% | 20.36% | 45.74% |
| 2023 | 26.19% | 22.69% | 49.27% |
| 2024 | 27.46% | 23.33% | 46.31% |

Russell 1000 Futures ADV and Average Open Interest



Data Source: CME Group as of May 18, 2023

Using E-mini Russell 2000 Futures around Reconstitution

Using CME E-mini Russell 2000 Futures around the Reconstitution

RTY Futures can be a cost efficient tool for shifting risk, and a convenient alternative to cash market instruments

- Rather than having to execute trades across 2000 or more individual names, an investor could simply trade E-mini Russell 2000 Index Futures (RTY) contracts in lieu of stocks
- The benefit of holding a futures position is that the investor does not have to trade the reconstitution themselves
- A long/short holder may replace their physical exposure with RTY exposure via two avenues:

Basis Trade at Index Close (BTIC)

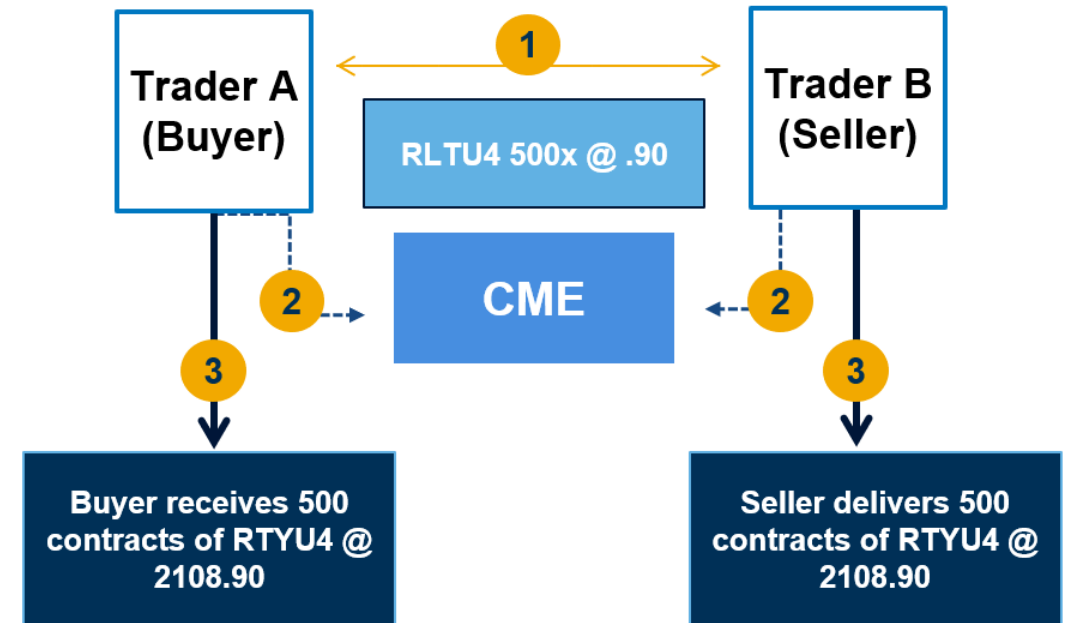
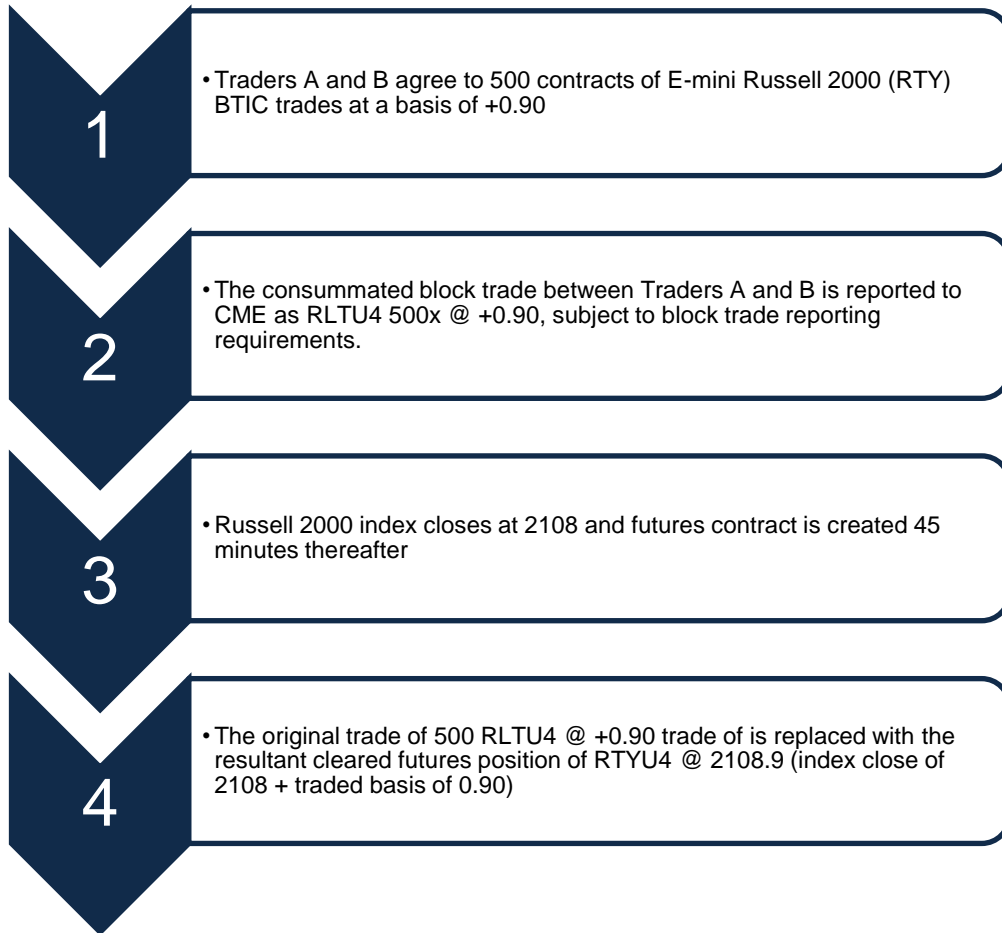
- Allows an investor to enter a futures position by reference to the closing value of the index itself
- By buying RTY contracts via a BTIC transaction and selling a comparably sized cash portfolio on the close, for instance, the investor can replace the stock position with minimal slippage

Exchange for Physical (EFP)

- Allows an investor to exchange shares for an equivalently scaled number of RTY contracts, and then to carry the resultant futures position through the index rebalancing
- Following index reconstitution, the investor may either execute a second EFP trade to move the index exposure back into a portfolio of shares or may continue to hold the index exposure in futures contract form for better capital efficiency

E-mini Russell 2000 Index Basis Trade at Index Close (BTIC) Example

Trader A and Trader B want to transact a BTIC block trade for E-mini Russell 2000 futures based on the closing value of the Russell Index



E-mini Russell 2000 Index Futures - EFP Example (Exchange for Physical)

| | Dealer | Investor |
|--|--|---|
| 1. Starting Position | Flat | +\$295M Russell 2000 Cash Basket |
| 2. EFP is privately negotiated | Broker and investor agree to terms of the EFP @ +0.70: <ul style="list-style-type: none"> Client buys / broker sells 2,800 RTYU4 at 2108.00, a +0.70 basis versus prior night's closing index level of 2107.30 Client sells / broker buys \$295M Russell 2000 Cash Basket | |
| 3. Broker reports cash trade to ACT | +\$295M Russell 2000 Cash Basket | -\$295M Russell 2000 Cash Basket |
| 4. EFP reported | EFP is reported to CME Clearport and submitted for clearing with a futures price of 2108 | |
| | <u>Broker Account 123</u> -2,800 RTYU4 @ 2108 | <u>Client Account 456</u> +2,800 RTYU4 @ 2108 |
| 5. Final Positions | +\$295M Cash Basket -2,800 RTYU4 Flat Market Exposure | +2,800 RTYU4 +\$295M E-mini Russell 2000 Futures, equivalent to the notional exposure of the Cash Basket |

EFPs are subject to the requirements of Rule 38 - <https://www.cmegroup.com/rulebook/files/cme-group-Rule-538.pdf>

Contact the Equity Products Team

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Thank you

Roundtable discussion

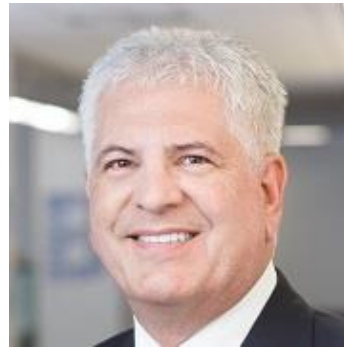
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