



HIDRA RESEARCH

Concentration in the largest S&P 500 companies

Annual rebalancing with commissions included

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Abstract

We study annually rebalanced portfolios of the largest companies in a historical S&P 500 proxy, using equal or market-capitalization weights. Initial capital is USD 1 million. We retain holdings that remain selected, adjust their weights and replace departing constituents at the first market opening of the new year. Modeled IBKR commissions are deducted on each trade, reducing the capital available for subsequent trades.

The common 2001–2025 window covers TOP 1–10: the equally weighted TOP 2 portfolio achieves a CAGR after commissions of 12.01%, compared with 8.74% for SPY. Results depend on the starting date: from 2000, TOP 1 achieves 6.47% and SPY 7.95%. TOP 2 is not retrospectively selected as an optimal rule.

The study also covers TOP 1–10 from 2000, using an explicitly accepted approximation for incomplete execution intervals affecting three historical securities. The main curve assumes no price movement during those intervals and uses the higher-commission scenario of the two hypothetical prices examined; both scenarios and a $\pm 10\%$ stress test are provided separately. TOP 4's relative performance conclusion can change within that stress test. This completes the exploratory scope, not an exact historical reconstruction or an account holding actual shares.

Keywords: concentration, market capitalization, total return, rebalancing, trading costs.

Figures are truncated to a maximum of two decimal places; calculations retain their original precision.

1 Data and portfolio rules

The 27 P123 snapshots for 1999–2025 contain 270 ranked places and provide 260 selections for the 26 complete calendar years 2000–2025, covering 32 identifiers. The provider's SP500 universe is a monthly updated proxy linked to IVV, not the official list of companies and their exact market capitalizations at the December close. The 1999 snapshot predates IVV's launch; it is retained as a provider approximation accepted for this research [1].

For each N from one to ten, we use the first N companies in the preceding snapshot. Weights are either $1/N$ or each company's market capitalization divided by the total capitalization of the selected companies. Securities are identified by UID, not just ticker, to avoid confusing different companies that reuse a symbol. The historical AT&T Corp is not replaced with the current AT&T Inc series.

In January, the existing portfolio remains exposed until the opening of the first trading session. We then trade only the difference between target and existing position values. Departing holdings are sold and new constituents bought at that same opening. There is no artificial December sale, repurchase of the entire portfolio or terminal liquidation. In TOP 1, Apple generates no order when it remains in the portfolio in January 2015.

$$\text{Net trade} = \text{target value after costs} - \text{existing value}$$

Compounding starts from USD 1 million, with no capital ceiling. P123's adjusted daily price ratios retain implicit dividends and corporate actions. For annual transitions with coverage, Yahoo provides open, close and adjusted close prices to value the outgoing holdings and the intraday return of the new portfolio. The use of multiple sources is explicit; it does not turn adjusted prices into executable quotes [2].

No separate dividend is added, as doing so would double-count its contribution to total return. Reinvestment is implicit: payment dates, withholding taxes, dividend cash and delivery of new share classes are not modeled. SPY uses the same entry date, total-return policy and initial cost treatment, and remains invested without annual turnover.

CAGR is the compound annual growth rate between the starting and ending dates. Maximum drawdown is measured against the preceding peak in equity, including initial capital. Charts use a logarithmic vertical scale and common units. The findings are exploratory, not an out-of-sample validation.

2 Annual portfolio results after commissions

Table 1. Full 2000–2025 window. CAGR after commissions and maximum drawdown. TOP 4–10 include the neutral approximation and the hypothetical USD 1 commission-price scenario described in Section 6.

Portfolio	CAGR equal	CAGR cap.	DD equal	DD cap.
TOP 1	6.47%	6.47%	-81.95%	-81.95%
TOP 2	9.70%	9.46%	-64.35%	-65.87%
TOP 3	8.27%	8.13%	-64.25%	-64.97%
TOP 4	7.89%	7.79%	-74.15%	-71.87%
TOP 5	8.31%	8.27%	-69.39%	-67.53%
TOP 6	7.97%	8.25%	-68.05%	-66.45%
TOP 7	6.62%	7.45%	-73.26%	-70.88%
TOP 8	6.18%	7.05%	-74.60%	-72.19%
TOP 9	6.66%	7.24%	-71.39%	-70.38%
TOP 10	6.20%	6.90%	-73.43%	-71.72%

Continuously held SPY: CAGR 7.95%; maximum drawdown -55.19%. TOP 2, TOP 3, TOP 5 and TOP 6 outperform the benchmark under both weighting schemes in the main scenario. Results close to the benchmark should be read alongside the opening-price sensitivity, not just the central estimate. TOP 2 has the highest observed CAGR; this is not a valid basis for selecting a future portfolio.

The year 2000 remains in the sample with its P123-adjusted losses. The technology-market decline has not been removed, nor have the portfolios been restarted in 2001 to improve the figures. The approximation concerns specific intervals without coverage and the commissions on their orders; it does not replace those companies' annual returns.

Comparison with a 2001 start

Table 2. Common 2001–2025 window, excluding the three affected historical UIDs. Independent accounts, each starting with USD 1 million. This window does not replace the one beginning in 2000.

Portfolio	CAGR equal	CAGR cap.	DD equal	DD cap.
TOP 1	11.00%	11.00%	-58.11%	-58.11%
TOP 2	12.01%	11.91%	-52.84%	-51.00%
TOP 3	10.39%	10.39%	-51.35%	-49.90%
TOP 4	10.60%	10.43%	-52.04%	-49.67%
TOP 5	10.75%	10.74%	-49.88%	-48.56%
TOP 6	10.25%	10.61%	-51.80%	-49.98%
TOP 7	8.83%	9.76%	-52.88%	-50.94%
TOP 8	8.77%	9.61%	-51.73%	-49.03%
TOP 9	8.86%	9.56%	-50.63%	-48.41%
TOP 10	8.29%	9.15%	-55.85%	-52.17%

Continuously held SPY achieves 8.74%. Equally weighted TOP 10 underperforms it, while market-cap-weighted TOP 10 outperforms it. Changing the starting date changes the comparison and initial selection, not just the chart presentation.

3 Subperiods and persistence of results

The split between the first decade and 2010–2025 is retained from the earlier research. It was chosen after inspecting the initial curves and is not an out-of-sample test. Each subperiod uses equity at the close preceding its first session as its base, retaining the return across the year-end transition.

Table 3. CAGR after commissions by subperiod. Equally weighted portfolios; accounts started in 2000. TOP 4–10 retain the approximation in Table 1.

Portfolio	2000 to 2009	2010 to 2025
TOP 1	-12.21%	20.11%
TOP 2	-6.43%	21.16%
TOP 3	-6.83%	18.91%
TOP 4	-8.47%	19.55%
TOP 5	-7.49%	19.51%
TOP 6	-6.25%	17.92%
TOP 7	-7.24%	16.31%
TOP 8	-8.16%	16.25%
TOP 9	-7.21%	16.35%
TOP 10	-7.38%	15.68%
SPY	-1.10%	14.02%

The comparison shows why a sample dominated by recent years does not necessarily describe the full cycle. Nor does it establish that concentration always fails in every crisis: companies, valuations, sectors and market conditions change simultaneously. Complete tables for both weighting schemes and V2 are retained in the CSV files.

We do not attribute the difference between the annual-liquidation and continuous-holding implementations to commissions. That correction also restored exposure between the December close and the January opening, and the return during the first session. The gross-versus-net comparison here uses the same mechanism and isolates the cost scenario, including its effect on future capital.

4 Commissions and funding portfolio adjustments

We use IBKR Pro Tiered USA with the fee schedule archived on 8 September 2026, including minimums, maximums, monthly tiers, regulatory and clearing charges, and pass-through fees. The venue scenario adds ARCA opening charges of 0.15 US cents per share or closing charges of 0.12 US cents. This is a constant fee schedule applied retrospectively, not a reconstruction of historical invoices or actual order routing [3].

Each net adjustment is converted into equivalent shares using the reconstructed contemporaneous price. The quantity used to calculate commissions is rounded up, including adjustments smaller than one share. The traded value remains synthetic. This approximation avoids assigning zero cost to those adjustments, but is not a ledger of actual whole shares. Implicit reinvestment does not generate a separate order.

Before investing, we reserve the cost, recalculate targets and orders, and repeat until the portfolio can pay its commissions without negative cash. The calculated commission reduces cash that day; subsequent trades start from the reduced equity. The nominal sum of commissions is not simply subtracted from final capital. Monthly volume is tracked independently for each variant, with sales counted before purchases.

Table 4. 2000–2025 window. Nominal sum of commissions in the main scenario and reduction in CAGR, in annual basis points (1 bp = 0.01 percentage points).

Portfolio	USD equal	USD cap.	bp equal	bp cap.
TOP 1	582.18	582.18	0.63	0.63
TOP 2	1,180.20	930.99	0.51	0.41
TOP 3	1,029.60	808.39	0.50	0.41
TOP 4	2,522.48	1,848.63	1.36	1.00
TOP 5	2,262.25	1,631.02	1.12	0.85
TOP 6	2,169.72	1,580.69	1.01	0.78
TOP 7	3,296.64	2,442.12	1.60	1.22
TOP 8	3,491.89	2,731.94	1.76	1.38
TOP 9	3,301.73	2,581.37	1.59	1.28
TOP 10	3,059.44	2,441.75	1.46	1.20

SPY incurs USD 35.12 on entry. For the three historical securities, the main scenario uses a hypothetical commission price of USD 1; the USD 1,000 alternative is provided so that this cost is not mistaken for a known invoice. Bid–ask spreads, slippage, market impact, taxes and the cost of implicit reinvestment are excluded.

5 Reweighting and volatility-based exposure

V2 retains TOP 1/3/5/10 and annual selection. It changes only the frequency of restoring target weights (annual, monthly or quarterly) and adjusting exposure (none, annual, monthly or quarterly). The annual capitalization snapshot still defines the target; no new monthly market capitalization is retrieved. All 96 original variants are calculated, including equivalent cases.

Table 5. CAGR after commissions for 2000–2025 at full exposure, by weight-reset frequency. TOP 5/10 include the 2000 approximation.

Portfolio	Annual	Monthly	Quarterly
TOP 1 equal	6.47%	6.47%	6.47%
TOP 1 cap.	6.47%	6.47%	6.47%
TOP 3 equal	8.27%	8.37%	8.40%
TOP 3 cap.	8.13%	8.21%	8.24%
TOP 5 equal	8.31%	8.05%	8.32%
TOP 5 cap.	8.27%	8.10%	8.32%
TOP 10 equal	6.20%	6.27%	6.56%
TOP 10 cap.	6.90%	6.97%	7.21%

Exposure is determined using 63 log returns preceding the trade, comparing SPY with a fully invested gross shadow portfolio using the same weight-reset frequency. The invested fraction is the smaller of one and the SPY-to-shadow volatility ratio; during the initial estimation period, exposure is 100%. There is no leverage and cash earns no interest.

Table 6. CAGR after commissions for 2000–2025 with equal weights restored annually, by exposure-adjustment frequency. The same approximation applies to TOP 5/10.

Portfolio	No adjustment	Annual	Monthly	Quarterly
TOP 1	6.47%	3.44%	5.16%	5.22%
TOP 3	8.27%	5.19%	7.05%	7.06%
TOP 5	8.31%	6.18%	7.56%	7.56%
TOP 10	6.20%	5.36%	6.34%	6.85%

Intermediate adjustments take place at the close of the first session of the period, as in the original V2; annual turnover takes place at the opening. If only weights change, the previous exposure fraction is retained after funding costs. If only exposure changes, the drifted relative weights are retained. When both coincide, a single net adjustment is made for each security.

6 Sensitivity to missing opening prices

The three historical securities are AT&T Corp (T.2^05), Nortel (NRTLQ^15) and Lucent (LU.1^06). Coverage is incomplete for entry on 3 January 2000 and exit on 2 January 2001. Their daily losses during 2000 are present in P123; the missing elements are the execution bridge and contemporaneous unadjusted quotes for calculating commissions. P123 open fields that repeat close values are not accepted as observed opening prices.

An additional search recovered a Lucent opening price of USD 13.75 in January 2001 from a contemporaneous Yahoo copy retained in CRAN zoo, and a preceding close of USD 13.50 corroborated in the press. This remains a candidate: corporate-action checks must be completed before treating the ratio as a total return. Five opening prices still lack a recovered source [4].

The separate diagnostic assigns either no movement or a simultaneous $\pm 10\%$ stress to intervals without coverage. P123 close-to-close returns during 2000 are retained in full. Commissions for those three securities use hypothetical nominal prices of USD 1 and USD 1,000. These prices are not historical imputations: they stress the conversion of traded value into share quantities.

Table 7. Equally weighted TOP 4–10 from 2000. The first neutral column is the accepted main scenario; the others show sensitivities, not confidence intervals.

Portfolio	Neutral price 1	Neutral price 1000	Stress –10%	Stress +10%
TOP 4	7.89%	7.89%	7.77%	8.02%
TOP 5	8.31%	8.31%	8.22%	8.40%
TOP 6	7.97%	7.97%	7.90%	8.05%
TOP 7	6.62%	6.63%	6.45%	6.81%
TOP 8	6.18%	6.19%	5.98%	6.40%
TOP 9	6.66%	6.67%	6.50%	6.84%
TOP 10	6.20%	6.21%	6.07%	6.36%

The range is not guaranteed: actual data could fall outside it. For TOP 4, the stress test can reverse the sign of performance relative to SPY. The issue therefore cannot be certified as immaterial in all cases. Market-cap-weighted results and all 58 affected variants, including V2, are retained across the five scenarios. The project owner explicitly accepted the neutral approximation with this sensitivity analysis on 1 October 2026. That acceptance closes the exploratory scope; it does not certify historical opening prices.

7 Conclusions and limitations

Continuous holdings and integrated commissions are implemented for TOP 1–10 and V2 over 2000–2025, with the accepted approximations. Continuing positions are retained and only differences are traded. Commissions reduce the equity path, but do not by themselves explain the large return differences between historical subperiods. Historical data issues remain in the appendix; accepting an approximation does not resolve them.

The evidence does not support extrapolating recent large-company leadership to the entire period. Nor does it establish a universal rule against concentration. Portfolio size, weighting and the starting date change the outcome. Choosing today the TOP portfolio that performed best would introduce retrospective selection.

Official membership and capitalization at every snapshot, the 2010 GE/Google selection boundary, some daily adjustment discrepancies and distributions in kind, and the historical opening prices described above remain uncertified. The account is still a synthetic total-return portfolio; adjustment costs are estimated using equivalent shares. A ledger of actual shares with payable dividends, actual position rounding and all corporate actions would be a separate extension, not something established by this model.

Reproduction

For the full window starting in 2000, the independent verifier reconstructs 1,804,764 daily valuations and 47,686 events, and recalculates 156,979 commissions using independent decimal arithmetic. The maximum daily difference is below 0.10 US cents. The 2001 window and gross-return reconciliation against V5 are checked separately. These controls verify arithmetic and consistency, not the historical accuracy of every source.

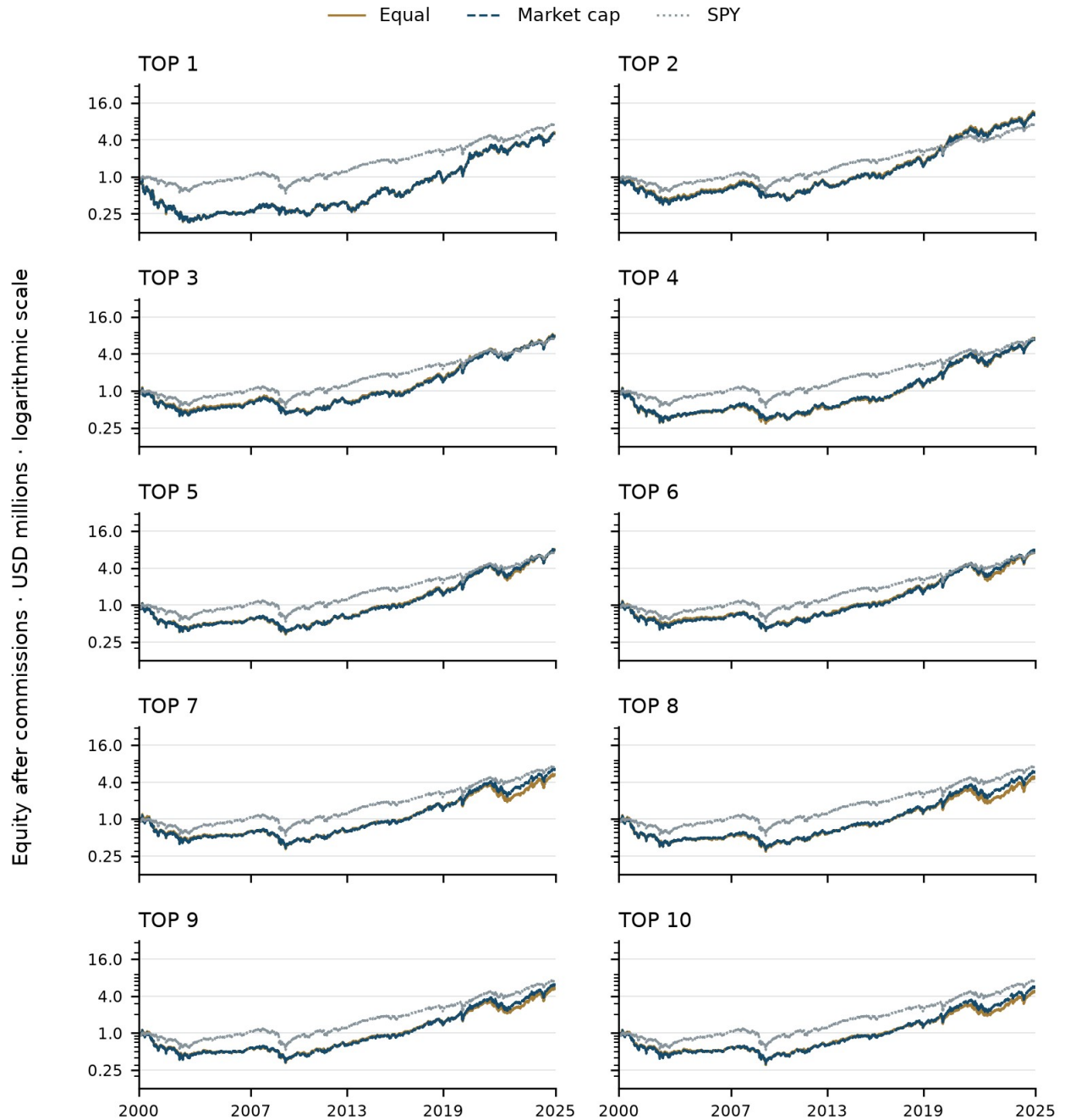
The daily, annual, metrics and events files retain dates, UUIDs, values before and after each trade, net traded amounts, cash, reconstructed or hypothetical prices, equivalent shares for commission calculations, cost components and the preceding volatility-estimation window. Cierre-v06 combines the 2000 window with the accepted approximation; Costes-integrados-v06 retains windows with coverage; Sensibilidad-aperturas-v06 supports verification of the five scenarios. Manifests and the reproduction guide accompany the research package. Reproduction requires no new P123 queries.

References

- [1] Portfolio123. SP500/MktCap snapshots and prices archived on 28 September 2026. Private sources and integrity records are retained in the MCAP-01 research folder; universe limitations are described in FICHA and Materiales/ORIGEN.md.
- [2] Yahoo Finance. Daily chart responses, OHLC, adjclose and corporate actions for 29 UUIDs, retained with SHA-256 hashes in yahoo-mcap-price-events-v03. SPY is in yahoo-spy-opening-v05.json. V5 continuous-holding protocol and audit, 1 October 2026.
- [3] Interactive Brokers. US Stocks IBKR Pro Tiered and NYSE Arca. Fee schedule archived on 08-09-2026: `ibkr_pro_variable_2026-09-08.json`. <https://www.interactivebrokers.com/en/pricing/commissions-stocks.php> and <https://www.interactivebrokers.com/en/accounts/fees/ARCAstkfee.php>. Frozen scenario, not historical invoices.
- [4] CRAN, zoo 1.0-0, `inst/doc/LU.rda` and associated tutorial, a copy of Yahoo Lucent quotes for 2001–2004. CBS, Wall Street Closes Out An Ugly Year, 29-12-2000. Evidence and links in `historical-opening-sources-v06/NOTAS_FUENTES.md`.
- [5] HIDRA Research. V6 integrated-cost and opening-price diagnostic protocols, 01-10-2026. V1–V5 are retained as earlier work, together with the appendix on source and corporate-action issues.

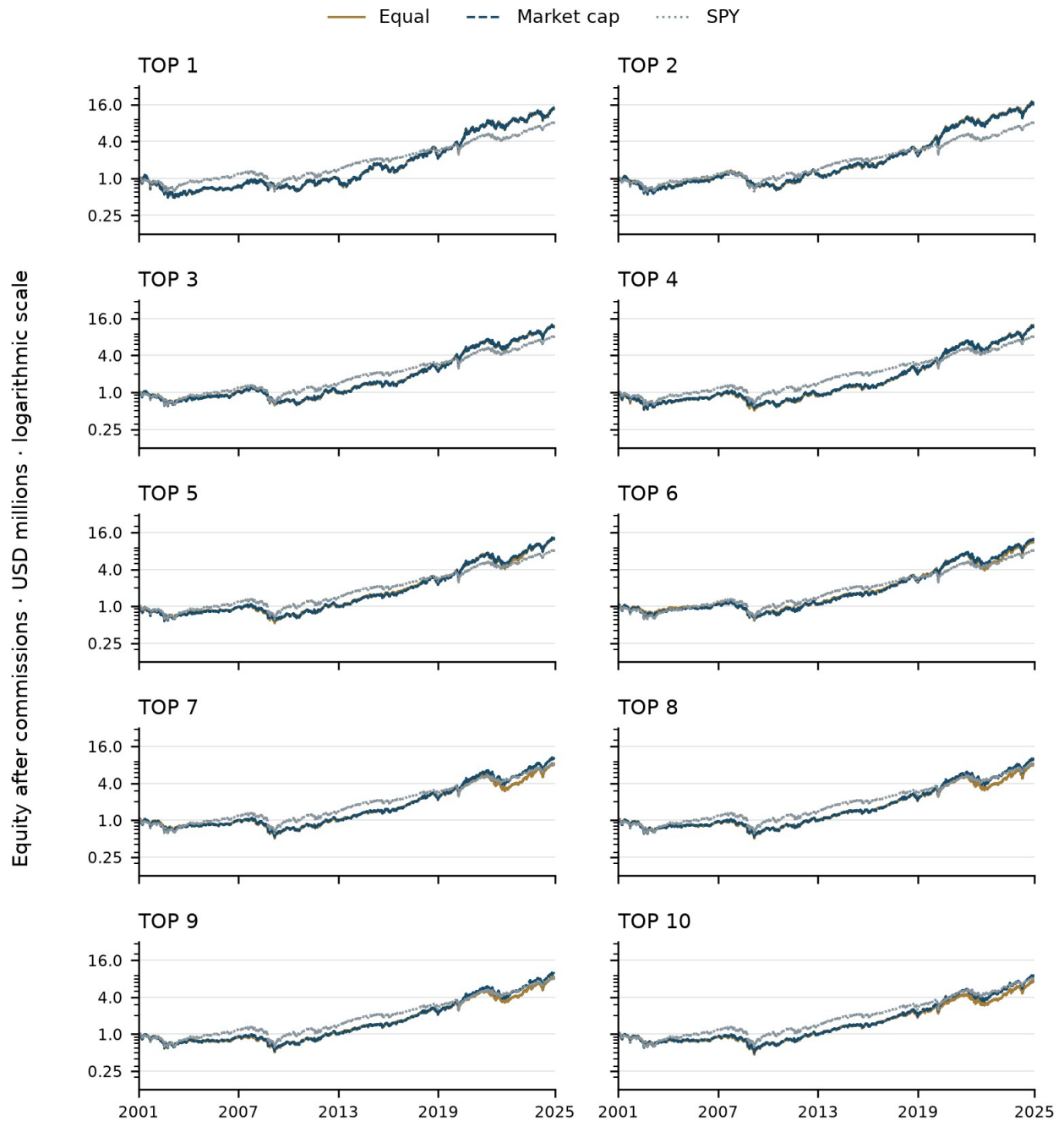
Appendix A Equity curves after commissions from 2000

TOP 1–10 and SPY, with initial capital of USD 1 million. TOP 4–10 include the neutral approximation and USD 1 commission-price scenario in Section 6. Common logarithmic scale.



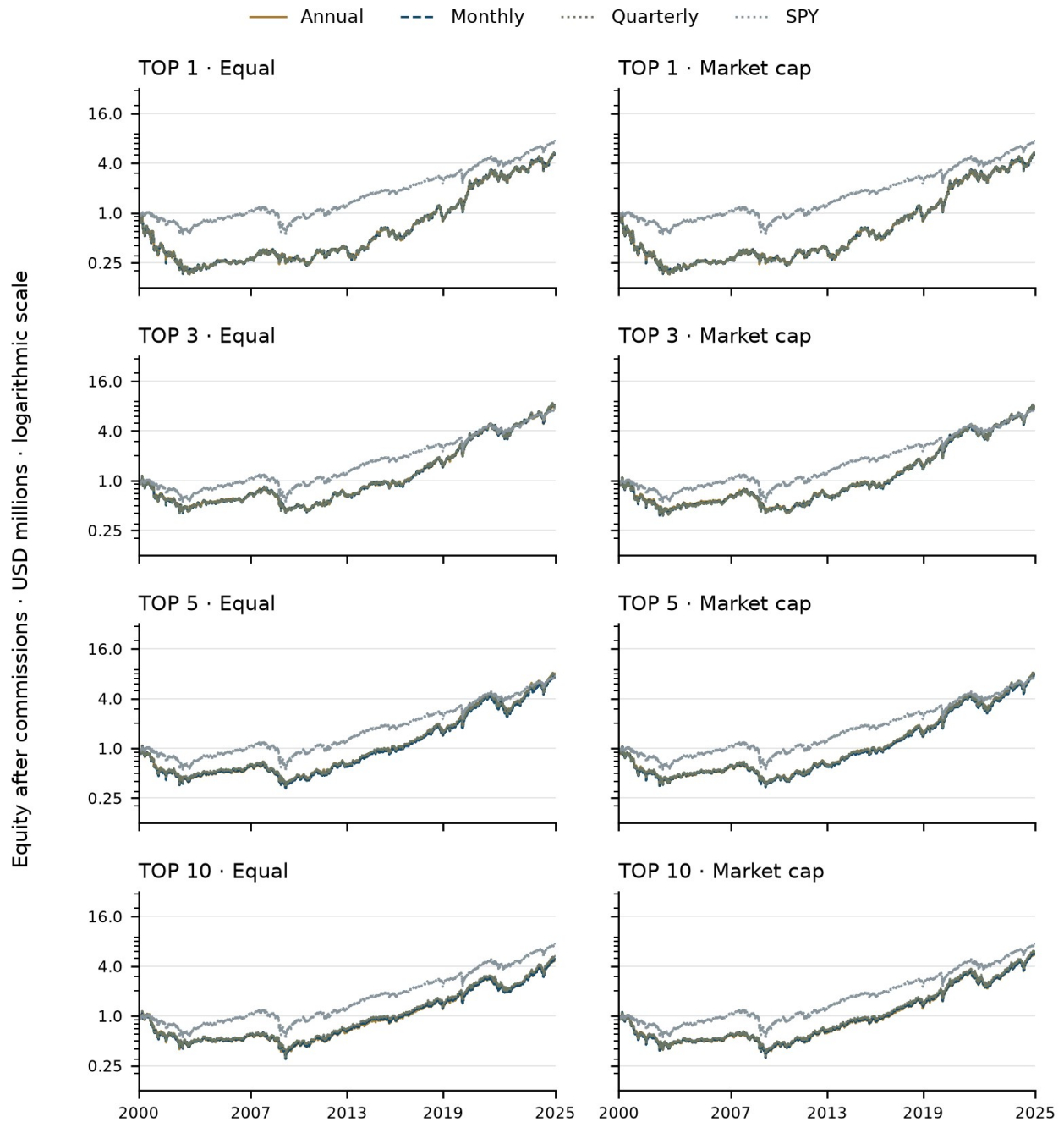
Appendix B Comparison from 2001

TOP 1–10 with commissions deducted from equity. This window excludes the three historical UIDs with incomplete coverage; it does not replace the 2000 window.



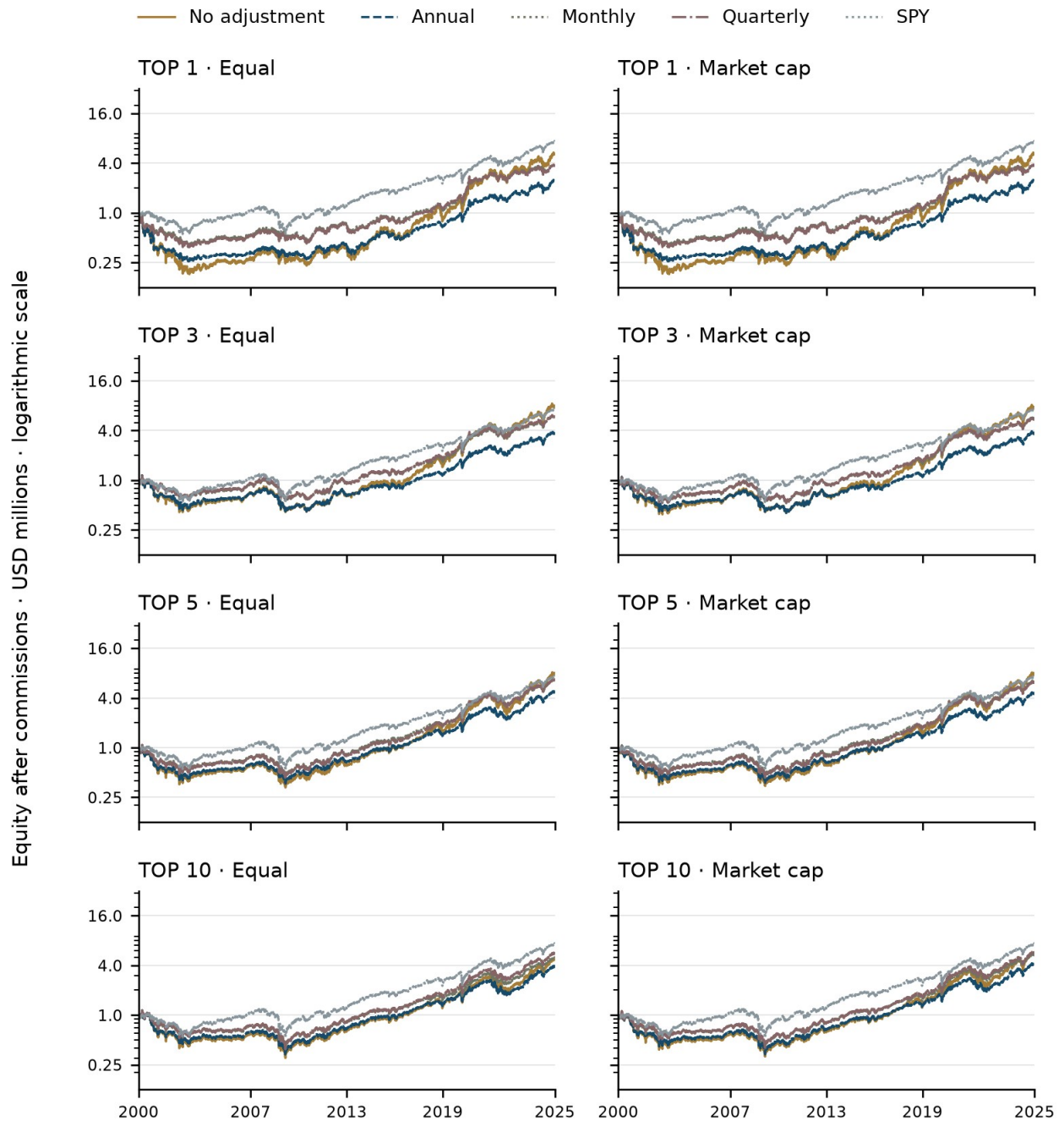
Appendix C Weight-reset frequency

V2 from 2000 at full exposure: annual, monthly and quarterly. TOP 5/10 include the approximation in Section 6. Annual selection, with commissions deducted.



Appendix D Exposure-adjustment frequency

V2 from 2000 with annual weights and costs. TOP 5/10 include the approximation in Section 6. Full exposure or annual, monthly and quarterly volatility-based adjustment.



Appendix E Return and risk relative to SPY

We compare all twenty annual TOP 1–10 variants with continuously held SPY, after modeled commissions. Tables E1–E3 distinguish realized historical returns, risk taken and estimated alpha relative to the benchmark. No curve is changed and no variant is selected using these additional metrics. Equal-weighted and market-cap-weighted TOP 1 are the same portfolio.

Excess CAGR is the percentage-point difference between the portfolio's and SPY's compound annual growth rates. Annual volatility uses the sample standard deviation of daily log returns multiplied by the square root of 252, as elsewhere in the study. Vol/SPY is the ratio of portfolio volatility to benchmark volatility: 1.50 means 50% more volatility. Maximum drawdown is calculated within each period and includes its initial equity.

Alpha is the intercept from a daily regression of the portfolio's simple return minus the risk-free rate on SPY's return minus the same rate. It is annualized by multiplying by 252; it is not a compound rate. Beta measures linear sensitivity to SPY's excess return. This single-factor alpha does not remove other factor exposures or demonstrate predictive ability.

$$R_{portfolio,t} - R_{f,t} = \alpha_{daily} + \beta (R_{SPY,t} - R_{f,t}) + \epsilon_t$$

R_f comes from the daily RF column in the Kenneth French Data Library, converted from percentages to fractions. The series uses a one-month US Treasury bill reference; its provider changes in June 2024. Only RF is used, not the library's market factor. The original file and aligned series are retained with SHA-256 hashes. The regression excludes the study's first day, which covers opening to closing; the other metrics include that return.

The CSV files provide 95% alpha intervals using Newey–West HAC standard errors with five lags, together with correlation, tracking error, information ratio and Sharpe ratio. These intervals are approximate and are not adjusted for multiple portfolio comparisons; a positive alpha point estimate alone does not establish a statistical advantage. Annual detail reports each year's return and excess return, not an annualization based on trading-day counts.

The 2000–2009 and 2010–2025 windows are descriptive splits chosen after inspecting the study. They inherit the limitations of the constituent proxy and corporate-action treatment. The 2000 period and January 2001 exit retain the accepted approximations for the three historical securities. This appendix neither replaces the sensitivity scenarios nor constitutes an out-of-sample test.

RF source: Kenneth R. French Data Library. https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html .
 Definition: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html . Accessed: 1 October 2026.

Comparison from 2000 to 2025

Table E1. Annual turnover and rebalancing, full exposure. Synthetic total return after commissions. Percentages except Vol/SPY and beta; excess return is in percentage points.

Portfolio	CAGR %	Excess pp	Vol. %	Vol/SPY	Beta	Alpha % annual	Max DD %
SPY	7.95	0.00	19.39	1.00	1.00	0.00	-55.19
TOP 1 equal	6.47	-1.48	30.00	1.55	1.12	0.30	-81.95
TOP 1 cap.	6.47	-1.48	30.00	1.55	1.12	0.30	-81.95
TOP 2 equal	9.70	1.75	25.42	1.31	1.06	2.47	-64.35
TOP 2 cap.	9.46	1.51	25.59	1.32	1.07	2.19	-65.87
TOP 3 equal	8.27	0.32	24.09	1.24	1.03	1.04	-64.25
TOP 3 cap.	8.13	0.18	24.14	1.25	1.04	0.84	-64.97
TOP 4 equal	7.89	-0.06	23.70	1.22	1.05	0.45	-74.15
TOP 4 cap.	7.79	-0.16	23.72	1.22	1.06	0.33	-71.87
TOP 5 equal	8.31	0.36	23.10	1.19	1.03	0.86	-69.39
TOP 5 cap.	8.27	0.32	23.09	1.19	1.04	0.76	-67.53
TOP 6 equal	7.97	0.02	22.84	1.18	1.03	0.45	-68.05
TOP 6 cap.	8.25	0.30	22.84	1.18	1.04	0.66	-66.45
TOP 7 equal	6.62	-1.33	23.19	1.20	1.06	-0.96	-73.26
TOP 7 cap.	7.45	-0.50	22.98	1.19	1.06	-0.19	-70.88
TOP 8 equal	6.18	-1.77	22.36	1.15	1.03	-1.34	-74.60
TOP 8 cap.	7.05	-0.90	22.48	1.16	1.04	-0.54	-72.19
TOP 9 equal	6.66	-1.29	21.10	1.09	0.99	-0.82	-71.39
TOP 9 cap.	7.24	-0.71	21.77	1.12	1.01	-0.32	-70.38
TOP 10 equal	6.20	-1.74	20.96	1.08	1.00	-1.36	-73.43
TOP 10 cap.	6.90	-1.04	21.68	1.12	1.02	-0.73	-71.72

Reading the equally weighted TOP 2 results: excess CAGR of 1.75 pp, volatility 1.31 times SPY's, and estimated annual alpha of 2.47%. Its 95% HAC interval is [-3.06%; 7.99%]. This illustrates how to read the table; it is not a portfolio selected for future use.

Volatility uses log returns; the regression uses simple returns and RF. Alpha and excess CAGR are not interchangeable. The remaining intervals and all 26 individual years are retained in the accompanying data.

Comparison from 2000 to 2009

Table E2. Annual turnover and rebalancing, full exposure. Synthetic total return after commissions. Percentages except Vol/SPY and beta; excess return is in percentage points.

Portfolio	CAGR %	Excess pp	Vol. %	Vol/SPY	Beta	Alpha % annual	Max DD %
SPY	-1.10	0.00	22.38	1.00	1.00	0.00	-55.19
TOP 1 equal	-12.21	-11.11	34.75	1.55	1.12	-8.40	-81.95
TOP 1 cap.	-12.21	-11.11	34.75	1.55	1.12	-8.40	-81.95
TOP 2 equal	-6.43	-5.33	27.21	1.22	0.98	-4.44	-64.35
TOP 2 cap.	-6.64	-5.54	27.63	1.23	1.00	-4.52	-65.87
TOP 3 equal	-6.83	-5.73	26.09	1.17	0.95	-5.17	-64.25
TOP 3 cap.	-7.09	-5.99	26.12	1.17	0.97	-5.43	-64.97
TOP 4 equal	-8.47	-7.37	25.77	1.15	1.00	-7.01	-74.15
TOP 4 cap.	-8.29	-7.18	25.83	1.15	1.00	-6.79	-71.87
TOP 5 equal	-7.49	-6.39	23.88	1.07	0.94	-6.46	-69.39
TOP 5 cap.	-7.59	-6.49	24.35	1.09	0.96	-6.44	-67.53
TOP 6 equal	-6.25	-5.15	24.11	1.08	0.95	-5.16	-68.05
TOP 6 cap.	-6.59	-5.49	24.32	1.09	0.96	-5.43	-66.45
TOP 7 equal	-7.24	-6.14	25.03	1.12	0.99	-5.94	-73.26
TOP 7 cap.	-7.35	-6.24	24.91	1.11	1.00	-6.06	-70.88
TOP 8 equal	-8.16	-7.06	24.40	1.09	0.97	-7.13	-74.60
TOP 8 cap.	-8.00	-6.90	24.41	1.09	0.98	-6.91	-72.19
TOP 9 equal	-7.21	-6.11	23.04	1.03	0.93	-6.45	-71.39
TOP 9 cap.	-7.46	-6.36	23.50	1.05	0.95	-6.57	-70.38
TOP 10 equal	-7.38	-6.28	23.75	1.06	0.97	-6.46	-73.43
TOP 10 cap.	-7.57	-6.47	23.86	1.07	0.98	-6.60	-71.72

Reading the equally weighted TOP 2 results: excess CAGR of -5.33 pp, volatility 1.22 times SPY's, and estimated annual alpha of -4.44%. Its 95% HAC interval is [-13.67%; 4.80%]. This illustrates how to read the table; it is not a portfolio selected for future use.

Volatility uses log returns; the regression uses simple returns and RF. Alpha and excess CAGR are not interchangeable. The remaining intervals and all 26 individual years are retained in the accompanying data.

Comparison from 2010 to 2025

Table E3. Annual turnover and rebalancing, full exposure. Synthetic total return after commissions. Percentages except Vol/SPY and beta; excess return is in percentage points.

Portfolio	CAGR %	Excess pp	Vol. %	Vol/SPY	Beta	Alpha % annual	Max DD %
SPY	14.02	0.00	17.25	1.00	1.00	0.00	-33.72
TOP 1 equal	20.11	6.10	26.58	1.54	1.11	5.77	-36.51
TOP 1 cap.	20.11	6.10	26.58	1.54	1.11	5.77	-36.51
TOP 2 equal	21.16	7.15	24.21	1.40	1.15	5.57	-32.71
TOP 2 cap.	20.89	6.88	24.21	1.40	1.15	5.37	-32.69
TOP 3 equal	18.91	4.89	22.73	1.32	1.12	3.77	-35.47
TOP 3 cap.	18.88	4.86	22.80	1.32	1.12	3.73	-34.76
TOP 4 equal	19.55	5.53	22.30	1.29	1.11	4.31	-39.37
TOP 4 cap.	19.23	5.21	22.28	1.29	1.11	4.02	-37.89
TOP 5 equal	19.51	5.50	22.58	1.31	1.13	4.09	-45.12
TOP 5 cap.	19.53	5.51	22.24	1.29	1.12	4.12	-40.90
TOP 6 equal	17.92	3.90	21.99	1.28	1.12	2.71	-48.50
TOP 6 cap.	18.69	4.67	21.84	1.27	1.12	3.38	-43.03
TOP 7 equal	16.31	2.29	21.95	1.27	1.13	1.20	-49.15
TOP 7 cap.	17.86	3.84	21.67	1.26	1.12	2.63	-43.47
TOP 8 equal	16.25	2.24	20.97	1.22	1.10	1.35	-42.96
TOP 8 cap.	17.67	3.65	21.16	1.23	1.10	2.57	-40.95
TOP 9 equal	16.35	2.34	19.78	1.15	1.05	1.79	-37.49
TOP 9 cap.	17.58	3.57	20.60	1.19	1.08	2.63	-39.25
TOP 10 equal	15.68	1.67	18.99	1.10	1.02	1.45	-35.29
TOP 10 cap.	17.07	3.06	20.17	1.17	1.07	2.29	-38.31

Reading the equally weighted TOP 2 results: excess CAGR of 7.15 pp, volatility 1.40 times SPY's, and estimated annual alpha of 5.57%. Its 95% HAC interval is [-1.28%; 12.41%]. This illustrates how to read the table; it is not a portfolio selected for future use.

Volatility uses log returns; the regression uses simple returns and RF. Alpha and excess CAGR are not interchangeable. The remaining intervals and all 26 individual years are retained in the accompanying data.