

Trading Boosters · Feb 4, 2025 · 40 min read

## US Stock Momentum Trading System for Retail Traders [Deep research]

Peter

I recently tested **ChatGPT Pro's Deep Research** functionality (released on Monday, February 3, 2025)—currently priced at \$200/month—using the latest **o3-mini-high** model. My objective? To evaluate how effectively it can assist in developing a **US Stock Momentum Trading System** for retail traders.

After about **10 minutes of AI-driven analysis**, the results were quite impressive. The model pulled together an extensive list of **sources**, showcasing its research capabilities, and even provided a **usable pseudocode** for an actual momentum strategy.

Deep Research is shaping up to be a powerful tool for trading strategy development, and in this article, you can see the full results—without having to pay \$200 yourself. Check out the AI's response below!

### Prompt I used:

*“Conduct a deep research study to develop a robust US stock momentum trading system for retail traders. The system should be designed to hold a maximum of 10 stocks per month, with a systematic approach to stock selection, entry, exit, and risk management.*

### *Key Requirements:*

*Universe of Stocks: Define the universe of stocks to be considered (e.g., S&P 500, Russell 1000, or all US-listed stocks with liquidity filters).*

*Momentum Criteria: Develop a quantitative momentum ranking methodology (e.g., 6-month/12-month price change, relative strength, moving average crossovers).*

*Holding Period & Rebalancing: Optimize the rebalancing frequency (e.g., monthly) and determine the most effective stock turnover rules.*

*Position Sizing: Define position sizing methods (e.g., equal weight, volatility-adjusted).*

*Risk Management: Implement stop-loss rules, maximum drawdown limits, and position risk controls.*

*Market Regime Adaptation: Explore methods to adapt the system during bull/bear markets (e.g., cash allocations, moving average filters).*

*Backtesting & Performance Metrics: Provide historical backtesting results, including CAGR, max drawdown, Sharpe ratio, and win rate, using at least 10+ years of data.*

*Practical Considerations: Address issues like trading costs, slippage, tax implications, and implementation feasibility for a retail trader.*

*The final output should include a detailed research report with all key parameters, data-driven justifications, and potential improvements for real-world implementation.*

*Objective: The goal is to create a practical, high-performing, and easy-to-execute momentum trading system tailored for individual retail traders with limited capital and execution constraints.”*

## Analysis I received:

Momentum investing is a strategy of “buying high and selling higher,” capitalizing on the tendency of recent stock winners to continue outperforming in the medium-term [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). This research outlines a robust momentum trading system tailored for U.S. stocks, suitable for smaller retail accounts. We cover the full design: stock universe selection, momentum ranking, holding period, position sizing, risk management, adaptation to market regimes, backtesting results, practical implementation issues, and pseudocode for implementation. Each component is backed by data and research findings.

## 1. Stock Universe and Liquidity Filters

A well-defined stock universe with liquid names is the foundation of a retail momentum strategy. We focus on **U.S. equities** with adequate liquidity and size to ensure easy trade execution and minimal slippage:

- **Index-Based Universe:** A common approach is to start with a broad index like the S&P 500 or Russell 1000 (large- and mid-cap stocks). These indexes cover large companies with high trading volume [stockcharts.com](https://stockcharts.com). For even broader exposure, some strategies use the S&P 1500 (which includes S&P 500, 400 MidCap, and 600 SmallCap) to incorporate smaller stocks while maintaining quality criteria [stockcharts.com](https://stockcharts.com). For example, one momentum system chose the S&P 1500 to cover all cap ranges but favored the S&P SmallCap 600 over the Russell 2000 due to stricter listing standards (ensuring higher quality small-caps) [stockcharts.com](https://stockcharts.com).
- **Liquidity Filter:** To avoid thinly traded stocks, apply minimum volume thresholds. A typical filter is to require an average daily **dollar volume** above a certain amount (e.g. \$5 million per day) [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com) or a share volume above, say, 300,000 shares per day [tradingmarkets.com](https://tradingmarkets.com) [tradingmarkets.com](https://tradingmarkets.com). High liquidity ensures tighter bid-ask spreads and the ability to enter/exit positions without significant price impact. Arthur Hill's momentum system, for instance, scans for stocks averaging over \$5M in daily trading value [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). Similarly, other experts suggest filtering for stocks trading at least 300k shares daily (over a 50-day average) to avoid "liquidity traps" [tradingmarkets.com](https://tradingmarkets.com) [tradingmarkets.com](https://tradingmarkets.com).
- **Price Filter:** Very low-priced stocks (penny stocks) often have high volatility and can distort a small account. Setting a minimum price (e.g. **\$10 or \$5**) helps remove ultra-low-priced stocks from the universe. Low-priced stocks tend to increase portfolio drawdowns without commensurate benefit [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). For example, excluding stocks below \$10 was found to improve the risk profile of a momentum portfolio [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
- **Exclude Micro-Caps:** If not already covered by the index selection, explicitly remove the smallest companies. Research shows momentum profits in micro-caps are often illusory once transaction costs are considered [eaminvestors.com](https://eaminvestors.com) [eaminvestors.com](https://eaminvestors.com). A practical rule is to exclude the bottom 20–25% of stocks by market cap to avoid illiquidity [quantpedia.com](https://quantpedia.com) [quantpedia.com](https://quantpedia.com). In other words, focus on mid- and large-cap stocks where momentum can be captured net of costs [eaminvestors.com](https://eaminvestors.com) [eaminvestors.com](https://eaminvestors.com).

By applying these universe filters, a retail trader keeps the pool to a manageable size (hundreds of stocks instead of thousands) and focuses on liquid names. For example, after applying liquidity, price, and volatility filters, one system reduced the S&P 1500 universe to about ~1,264 tradable stocks [stockcharts.com](#) [stockcharts.com](#). This approach balances breadth (to have enough candidates) with practicality (to ensure trades can be executed easily).

## 2. Momentum Ranking Criteria

With a defined universe, the next step is **quantitatively ranking stocks by momentum**. Momentum can be measured in various ways – the goal is to identify stocks with the strongest **price strength and trend persistence**. Key criteria and indicators include:

- **Relative Price Strength (Return-Based Momentum):** The classic metric is past returns over a medium-term horizon. Academic studies typically use **12-month returns excluding the last month** (often called 12-1 momentum) to rank stocks [stockopedia.com](#). In practice, many momentum traders use 6-month or 9-month returns as well. For example, a **26-week (about 6-month) rate-of-change (ROC)** is a “pure” price momentum indicator that captures recent performance [stockcharts.com](#) [stockcharts.com](#). In one system, stocks were ranked by 26-week ROC and the top performers were selected as momentum buys [stockcharts.com](#) [stockcharts.com](#). Another approach is **52-week total return** or **1-year relative strength** of the stock versus the market [stockopedia.com](#) [stockopedia.com](#). The core idea is to quantitatively score each stock by its past price appreciation – higher past return implies higher momentum rank.
- **Trend Validation (Moving Averages):** To ensure the stock’s uptrend is intact (and not just a short-term spike), incorporate moving-average based rules. Many momentum systems require a stock’s price to be above certain moving averages or have a bullish crossover:
  - Example: Check that the stock’s **10-week EMA is above the 40-week EMA** (i.e. intermediate uptrend) before considering it [stockcharts.comstockcharts.com](#).
  - Or require price is trading above its 200-day moving average (long-term trend) as a condition to count it as a valid momentum candidate [stockopedia.com](#) [stockopedia.com](#).

- Some ranking systems even include the **50-day vs 200-day MA crossover** as part of the momentum score (to favor stocks in a golden-cross state) [stockopedia.com](#) [stockopedia.com](#). These trend filters make sure we're buying stocks in sustained uptrends, not those that are up recently but still in longer-term downtrends.
- **Proximity to Highs:** Momentum stocks often hover near their price highs. A metric used in some rankings is how close the stock is to its **52-week high**. The closer, the stronger the momentum signal. For instance, Stockopedia's Momentum Rank gives weight to stocks near their one-year high [stockopedia.com](#) [stockopedia.com](#). A stock hitting new highs reflects strong buying interest and relative strength.
- **Relative Strength vs Peers or Index:** Instead of absolute returns, we can use **relative strength** – how a stock performed versus the overall market or its sector. For example, calculate each stock's return over 6 months minus the S&P 500's return (or divide to get a ratio). This identifies stocks outperforming the market. Stockopedia includes a **6-month and 12-month relative strength vs market** in its momentum blend [stockopedia.com](#) [stockopedia.com](#). A **strong momentum stock** will have beaten the index by a wide margin over the lookback period.
- **Composite Momentum Score:** Some advanced approaches combine multiple momentum indicators. For instance, a composite could blend **price momentum** (as above) with **earnings momentum** (e.g. recent earnings surprises or analyst upgrades) [stockopedia.com](#) [stockopedia.com](#). However, to keep the system straightforward for technical traders, price-based metrics alone are sufficient. The key is consistency: use a **quantitative formula** to score each stock. An example composite score might be: *50% weight to 6-month price return + 50% weight to 12-month return* (or including 52-week high percentile).
- **Momentum Score Normalization:** It can be useful to rank stocks from 0 to 100 based on momentum criteria each period. For instance, assign 100 to the highest 6-month return in the universe and 0 to the lowest, then pick the top percentile. This ensures an objective selection of “top 10” winners at each rebalance.

By using these criteria, the system identifies the **leaders (“recent winners”)** in the market. This implements the mantra of momentum investing – buy stocks that are already going up strongly [stockopedia.com](#). Studies have shown this approach to be effective because investors and even company management under-react to positive changes, allowing trends to persist [stockopedia.com](#). **Regular ranking updates** are

crucial: momentum is a fast-changing factor, so one must frequently scan and rerank to catch new leaders as old trends fade [stockopedia.com](http://stockopedia.com) [stockopedia.com](http://stockopedia.com).

### 3. Holding Period and Rebalancing Frequency

Momentum strategies inherently require **regular rebalancing** to rotate into the newest outperforming stocks. The optimal holding period balances capturing the momentum effect versus incurring too much turnover:

- **Frequency:** A **monthly rebalancing** schedule is a common choice for momentum portfolios. Academic research often measures momentum over 3-12 months and holds for 1 month before re-evaluating (the standard J=12, K=1 strategy) [stockopedia.com](http://stockopedia.com). For retail traders, monthly is practical and aligns with many studies showing momentum decays after roughly 6-12 months [stockopedia.com](http://stockopedia.com). In our system, we will **refresh the portfolio every month**, selling stocks that have fallen out of favor and buying those now ranking at the top. This frequency keeps the portfolio aligned with current trends without trading every week (which would increase costs). In fact, an analysis by Validea found that a **monthly rebalancing** was optimal for a 10-stock momentum portfolio, producing higher returns than quarterly or annual rebalances [validea.com](http://validea.com) [validea.com](http://validea.com).
- **Holding Period:** With monthly checks, a given stock might be held for one month or for several months, depending on whether it stays in the top momentum rank. Winners can sometimes persist – a stock might remain among the top 10 for multiple periods until its performance cools off. But if its momentum deteriorates, it will be replaced. This **adaptive holding period** means winners run as long as they keep outperforming, and laggards are removed quickly. For example, in one rotational system, stocks were bought when in the top 15 by momentum and only sold when they dropped out of the top 150 rank, leading to an average hold of a few months [stockcharts.com](http://stockcharts.com) [stockcharts.com](http://stockcharts.com).
- **Number of Stocks (Portfolio Size):** We limit the portfolio to a manageable number of positions – **up to 10 stocks**. Holding the **top 10** momentum names is a reasonable balance for a small account:
  - It provides *diversification* across multiple winners (reducing idiosyncratic risk of any one stock).
  - It's not so many positions that the portfolio just mimics an index – we're still concentrating in the best 1% of the universe if 1000 stocks are considered.



- Both empirical results and practical constraints support 10 stocks. For instance, Validea’s long-term test of a momentum model showed the **10-stock portfolio outperformed broader portfolios** and was the recommended size [validea.com](https://www.validea.com). Similarly, an academic study on “**momentum in small portfolios**” used 10 stocks on the long side as a test case [quantpedia.com](https://quantpedia.com).
- **Turnover and Stock Replacement Rules:** At each monthly rebalance, we will **sell any stock in the portfolio that is no longer among the top momentum ranks** (e.g. no longer in the top 10% of momentum scores or specifically, it’s fallen out of the top 10 list). Those positions are replaced with the highest-ranked stocks that are not currently held. If a current holding remains in the top ranks, we keep it for another month. This approach ensures we only trade when there is a **change in leadership**. In practice, expect some turnover each month – momentum portfolios can have turnover on the order of 100%–300% per year, depending on market conditions [eaminvestors.com](https://eaminvestors.com). One backtest averaged about **7 trades per month** for a ~15-stock momentum portfolio, i.e. roughly half the positions rotating monthly [stockcharts.com](https://stockcharts.com). We aim to keep turnover reasonable by capping portfolio size at 10 and not forcing trades if a leader remains strong.
- **Staggering and Overlap:** Some traders stagger rebalances (e.g., rotate 1/4 of the portfolio weekly) to smooth out trading and avoid all positions changing at once. However, for simplicity, our design assumes a single monthly rotation date for all holdings.
- **Rebalance Timing:** A common choice is the **end of month** or beginning of month. For example, calculate momentum ranks on the last trading day of each month and execute trades on the first trading day of the next month. This schedule aligns with many institutional rebalancing cycles and ensures using full-month price data for ranking. It’s also convenient for a retail trader to schedule. We will assume monthly ranks based on closing prices (adjusted for dividends) at month-end, and trades at next open (or close, depending on execution preference).

In summary, the strategy will hold a **rotating basket of ~10 top momentum stocks, updated monthly**. Regular rebalancing is critical – as one study notes, momentum requires continually **refreshing into recent winners**, since even the strongest trends tend to revert after 6-12 months [stockopedia.com](https://stockopedia.com). Monthly turnover

allows the strategy to **stay in phase with shifting market leadership**, which is vital for maintaining performance.

## 4. Position Sizing for Small Accounts

Position sizing determines how much capital to allocate to each stock. For smaller accounts, position sizing must balance simplicity, risk control, and account constraints (like avoiding too many small odd-lot trades). We consider a few approaches:

- **Equal Weighting:** The simplest method is to allocate equal capital to each of the 10 stocks (i.e., 10% of the portfolio each). Equal weighting is intuitive and ensures diversification – no single position dominates the account. It also tends to naturally give a slight tilt toward smaller-cap within the chosen universe (since you invest equal dollars, not by market cap). Many momentum indices and research portfolios use equal weighting for the long positions [spglobal.com](http://spglobal.com). In fact, the classic momentum factor is often constructed with equal-weight longs and shorts in each bucket [spglobal.com](http://spglobal.com). For a retail trader, equal weight is *easy to implement* (just divide capital by number of stocks) and avoids the need for complex calculations. Notably, a risk analysis found that a sophisticated volatility-based weighting didn't significantly improve outcomes over equal weighting in a momentum strategy during market stress – in highly volatile downturns, correlations spike and **risk parity offered little advantage over equal allocation** [turingtrader.com](http://turingtrader.com) [turingtrader.com](http://turingtrader.com). Given that, equal weighting is a robust default choice.
- **Fixed Fractional / Risk-Based Sizing:** Another approach is to size each position so that a similar amount of capital is at risk in each trade. For example, a trader might risk 1% of the account per position based on a stop-loss distance. This involves calculating position size from the entry price and stop price. If willing to lose at most \$100 on a \$10,000 account (1%), and the stop is 10% below entry, one could buy  $\$100 / (\$ \text{entry} * 10\%)$  worth of shares. This is essentially the **percentage risk model**, which formula can be stated as: 
$$\text{Position Size (shares)} = \frac{\text{Account Capital} \times \text{Risk \% per trade}}{\text{Entry Price} - \text{Stop Price}}$$
 Using such a formula ensures each position, if stopped out, hurts the portfolio roughly equally [fastercapital.com](http://fastercapital.com) [fastercapital.com](http://fastercapital.com). Andreas Glenow's momentum strategy (from *Stocks on the Move*) uses a variant of this, sizing positions so that each has the same volatility risk (based on ATR) – a form of risk parity across positions. This **volatility-adjusted sizing** gives smaller positions in



more volatile stocks and larger positions in steadier stocks, aiming for equal risk contribution. For example, one can divide the intended dollar risk by the stock's ATR (average true range) to determine shares [fastercapital.com](https://fastercapital.com) [fastercapital.com](https://fastercapital.com). The iShares Momentum ETF (MTUM) follows a similar principle by using *risk-adjusted momentum scores and weighting* (tilting towards lower-volatility names) [blog.thinknewfound.com](https://blog.thinknewfound.com) [blog.thinknewfound.com](https://blog.thinknewfound.com).

**Pros:** Risk-based sizing can prevent a highly volatile stock from having an outsized impact on the portfolio.

**Cons:** It can be complex for small accounts (might result in odd lots or using fractional shares), and in very calm markets it could over-leverage into low-volatility stocks [turingtrader.com](https://turingtrader.com) [turingtrader.com](https://turingtrader.com). To keep it practical, a trader with limited capital might approximate this by slightly reducing allocation to extremely volatile picks (e.g., allocate 5% instead of 10% if a stock is exceptionally volatile).

- **Capital Limits per Position:** Regardless of method, it's wise to impose a **max position cap** (for instance, no single stock >15% of the portfolio). This ensures some minimum diversification. Glenow's risk-parity system sometimes would concentrate too much in one low-volatility stock, so an improvement was to cap position size as a percent of capital [turingtrader.com](https://turingtrader.com) [turingtrader.com](https://turingtrader.com). In our 10-stock setup, equal weight already implies 10% each, but if risk sizing is used, enforce that no position goes beyond say 15% of account.
- **Round Numbers and Small Account Constraints:** With a small account (say \$5,000 – \$20,000), dividing into 10 positions means some buys could be only a few hundred dollars. Commission-free trading mitigates cost concerns here, but traders may have to buy fractional shares if stock prices are high. For example, \$500 allocated to a \$300 stock is less than 2 shares – many brokers allow fractional shares to solve this. If fractions aren't available, one might drop to 5 positions for a very small account to keep each position size larger (though at the cost of higher concentration). Generally, for accounts above \$10k, 10 positions is feasible with fractional share support or selecting somewhat lower-priced stocks (we already filter out extremely low-priced, but we can also avoid very high-priced stocks if fractional shares are an issue).
- **Leverage:** We do **not** incorporate leverage in this system – small accounts should be cautious with margin, especially for a volatile strategy like momentum. Each position is fully paid by cash (or only using standard margin for convenience, not to exceed 100% allocation total). This avoids magnifying losses and drawdowns.

In summary, **equal-weighting 10 positions (approximately 10% of capital each)** is a solid baseline for a retail momentum portfolio. It's straightforward and has been used in many momentum implementations [spglobal.com](http://spglobal.com) [spglobal.com](http://spglobal.com). Traders seeking more refinement can use a risk-based formula (ensuring, for example, each position would lose ~1% of account if stopped out), but should be mindful that in extreme markets equal-weight and risk-weight tend to converge in outcome [turingtrader.com](http://turingtrader.com). The priority is to ensure no single trade can make or break the account – distributing risk evenly across positions.

## 5. Risk Management Rules

Momentum trading can be highly profitable but also volatile. Proper **risk management** is critical to protect the downside and preserve capital through inevitable drawdowns. We incorporate several layers of risk control:

- **Stop-Loss for Each Position:** Implement a **stop-loss order** or exit rule for individual stocks to limit loss on any single trade. A common stop level is around **8–15% below the entry price** (or trailing from the peak). For example, one study suggested a **10% stop-loss** as a simple way to curb momentum crashes [cicfconf.org](http://cicfconf.org) [cicfconf.org](http://cicfconf.org). Empirical tests found that adding a 10% stop to a momentum strategy dramatically reduced crash losses – the worst monthly loss improved from nearly –50% to about –11%, and **Sharpe ratios more than doubled** with stop-loss protection [cicfconf.org](http://cicfconf.org) [cicfconf.org](http://cicfconf.org). In our system, a *10% trailing stop* could be used: if any position falls 10% from its highest closing price since entry, we sell it. This ensures we cut losers before they grow too large. Alternatively, one could use a fixed stop (e.g., 15% below purchase price) and update it if holding for multiple months (essentially a trailing stop). The stop percentage can be adjusted to balance being too tight (stopping out on normal noise) vs. too loose (allowing big drawdowns). **ATR-based stops** are another option: e.g., exit if price falls  $2 * \text{ATR}$  below a recent high, which adapts to each stock's volatility.
- **Position Risk Limits:** Tied to position sizing, we maintain that each trade risks only a small portion of the account (typically 1-2%). By sizing positions appropriately (Section 4), a stop-out will only cost, say, 1% of total capital. This prevents any single bad pick from causing serious damage. It's important the trader honors the

stop – *do not widen it in hopes of a rebound*. If stopped, the discipline is to take the loss and move on to a new leader next cycle.

- **Diversification and Sector Limits:** We limit the portfolio to 10 stocks **across different industries** if possible. Sometimes momentum leaders cluster in one hot sector (e.g., many tech stocks). While we won't enforce a strict sector quota in the ranking, a practical rule is *not to let all 10 picks come from the same sector*. For example, if 7 of the top 10 momentum stocks are all biotech, one might choose only the top 3-4 from that group and take the next ranked stocks from other sectors for the remaining slots. This avoids excessive sector-specific risk (like a regulatory change tanking all biotech positions at once). Ensuring some diversity in holdings improves the stability of returns.
- **Overall Portfolio Stop / Drawdown Control:** In addition to individual stops, consider a **max drawdown rule** at the portfolio level. For instance, if the total portfolio equity falls more than, say, **15% below its recent peak**, one might reduce all positions or move partly to cash to stem further losses. This is a “circuit breaker” to prevent a freefall. Some traders use a tiered approach: e.g., at -10% from peak, halve position sizes; at -20%, move to cash and reevaluate. Our system includes a market regime filter (next section) which will naturally reduce exposure in a prolonged downtrend, but a drawdown stop is an extra fail-safe for sudden crashes. By defining a pain threshold (like 20% drawdown), the trader can preserve capital to re-enter when conditions improve.
- **Volatility Monitoring:** Momentum portfolios can experience periods of high volatility (especially during trend reversals). Research has noted that **surging volatility in a momentum strategy often precedes crashes** [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). A practical adaptation: if we observe the portfolio's daily swings becoming unusually large (e.g., several days of  $\pm 3\%$  moves, indicating volatility regime change), we might tighten stops or temporarily scale back exposure. This aligns with the idea of **volatility targeting** – when volatility is high, reduce position sizes or hold more cash [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). For a retail trader, a simple rule could be: if the VIX (volatility index) or the standard deviation of portfolio returns in the last month is above a certain level, cut all positions by, say, 50%. This is an optional layer for advanced risk control.
- **Avoiding Gaps and Low-Liquidity Exits:** Use liquid stocks (as per our universe filter) so that stop-loss orders can execute near the intended price. Be cautious if a stock gaps down sharply below the stop (risking a larger loss) – this is another reason for

diversification, so one gap doesn't ruin the account. Stops should ideally be mental/planned if one can monitor the market, with actual market orders used once the stop level is hit intraday or at close. This avoids getting picked off by market makers in thin trading. If unable to monitor, a standing stop-market order can be placed, accepting some slippage in worst-case scenarios.

- **No Shorting (for this system):** Short positions are omitted, not just because many small accounts can't short easily (especially in retirement accounts), but also because **long-only momentum avoids the most severe "momentum crash" scenarios** that plague long-short momentum [stockopedia.com](http://stockopedia.com) [stockopedia.com](http://stockopedia.com). In a fierce rebound (like March 2009), shorting losers causes huge losses, whereas a long-only momentum strategy simply underperforms but doesn't blow up to the same extent [stockopedia.com](http://stockopedia.com) [stockopedia.com](http://stockopedia.com). Thus, sticking to long positions inherently limits risk relative to market-neutral momentum.

In combination, these risk measures aim to **mitigate downside while preserving upside**. Momentum trading will still have drawdowns – it's volatile by nature [stockcharts.com](http://stockcharts.com) – but prudent risk management ensures that no single trade or market event destroys our capital. For example, a well-managed momentum portfolio in testing had a **max drawdown of ~20%** while delivering strong returns [stockcharts.com](http://stockcharts.com) [stockcharts.com](http://stockcharts.com), thanks to trend filters and stops. The trader's mindset must be disciplined: accept many small losses (momentum strategies often have 40–50% losing trades [stockcharts.com](http://stockcharts.com) [stockcharts.com](http://stockcharts.com)) in exchange for big winners that drive the profits. Risk rules enforce those small losses and prevent holding the losers too long.

## 6. Adapting to Market Regimes

Market conditions fluctuate between bull markets, bear markets, and sideways periods. A robust momentum system should **adapt to different market regimes** to avoid chasing momentum in unfavorable environments. We incorporate mechanisms to detect regime changes and adjust our strategy:

- **Market Trend Filter:** We use a **trend-following filter on a broad market index (e.g., S&P 500)** to decide when to be fully invested in momentum stocks vs. when to play defense. A common rule is to require the **market to be in an uptrend (bullish)** before taking long positions. For example, only trade momentum longs when the S&P 500's 50-day EMA is above its 200-day EMA (a "Golden Cross" indicating a bull market)

[stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). If the index falls into a downtrend (50-day EMA crosses below 200-day, a bear signal), pause new long entries. Arthur Hill's system applied this: it would not initiate new momentum buys if the S&P 500 was below its long-term average [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). We can use a simpler variant: if the S&P 500 is trading below its 200-day moving average, we **don't open new positions** and possibly hold cash or a defensive asset instead. This filter keeps us mostly out of equities during bear markets, thereby avoiding large drawdowns from broad market crashes. Notably, a known momentum strategy improvement by Glenow also employed a 200-day MA filter on the S&P 500 to determine when to be in or out of equities [therobusttrader.com](https://therobusttrader.com) [therobusttrader.com](https://therobusttrader.com).

- **Cash or Defensive Allocation:** During those “risk-off” periods when the market trend filter is negative, the strategy can allocate to cash or an alternative asset. One approach is **absolute momentum (dual momentum)**: if equities have poor momentum relative to a safe asset, shift to that asset. For example, Gary Antonacci's Dual Momentum model switches to bonds or T-bills when stock momentum is negative. In our context, when the equity trend is bearish, a retail trader might put the portfolio in short-term bond ETFs or simply stay in cash until the uptrend resumes. The TuringTrader enhancements to Glenow's system did something similar: they **gradually exited to cash as volatility rose, and even allocated to a bond strategy (“Buoy”) during bearish regimes** [turingtrader.com](https://turingtrader.com) [turingtrader.com](https://turingtrader.com). This kind of dynamic allocation smooths the equity curve. For simplicity, we can say: if the S&P 500 is below its 200-day MA (bearish), move uninvested capital into a safe money market fund or bond ETF. This way, the strategy isn't idle; it either protects capital or earns a small yield while waiting for favorable conditions.
- **Reduced Exposure in Volatile Markets:** As mentioned in risk management, high market volatility often precedes momentum crashes [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). A volatility-sensitive regime filter could be: if the 1-month realized volatility of the S&P 500 exceeds some threshold (or VIX is very high), we reduce the number of momentum stocks or position sizes. Essentially, treat extreme volatility as a warning sign of potential trend reversal. The academic paper “Momentum Has Its Moments” (Barroso & Santa-Clara, 2015) demonstrated that adjusting exposure based on momentum strategy's own volatility significantly improves Sharpe [stockopedia.com](https://stockopedia.com). While implementing their exact volatility targeting might be complex for individuals [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com), a

heuristic could be: if our portfolio experiences unusually large swings, step to the sidelines. In practice, if one month our momentum portfolio loses, say, 5-10% while the market also was down and choppy, it might be time to temporarily cut to fewer positions or cash until trends re-establish.

- **Bear Market Rebound Indicator:** Momentum tends to crash at the end of bear markets when a sharp rebound lifts the prior losers [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). Research by Daniel and Moskowitz (2016) and others found that the worst momentum crashes happened when the market had been down over the past 1-2 years (bearish backdrop) and then had a strong positive month [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). In other words, a *violent bear market rally* is when long-only momentum can lag badly (because momentum portfolios would be in the defensive stocks that had held up, which then lag the rally). A practical adaptation: **if the market shows a sudden strong rebound after a prolonged decline**, one might suspend the momentum strategy for a short period. For instance, if the S&P 500 was down year-over-year but just rallied, say, +10% in a month, be cautious – that’s a regime where momentum leadership might flip quickly. A recent study in 2022 proposed a “crash indicator” combining a bear market flag (market down over 2 years) and a rebound flag (recent one-month surge) to warn of momentum crashes [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). Translating to our system: if such conditions occur, we could choose to **hold cash for a month or two** rather than rotating into new momentum names that may be the wrong ones for the new regime.
- **Re-entering After Cash:** The system needs a rule for when to get back in after a defensive stance. The simplest is to mirror the entry filter: once the S&P 500 closes back above its 200-day MA (or the 50-day crosses above 200-day), resume normal momentum trading from the next rebalance. This avoids trying to time the bottom perfectly – we just wait for evidence of an uptrend. Yes, this might miss the initial bounce off a low, but it sidesteps the most treacherous phase and still participates in the bulk of the new uptrend. Historically, such trend-following filters have saved a momentum strategy from heavy losses in major bear markets while sacrificing only a little return [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
- **Alternate Strategy in Sideways Markets:** In prolonged sideways markets, momentum might whipsaw (leaders change quickly with no follow-through). The regime filter will help (if the index is trendless around the MA, it may cause some in-and-out). An enhancement could be using a **shorter-term mean reversion strategy** in range-



bound conditions, but that is beyond our scope. Instead, we acknowledge momentum can underperform in choppy markets [investopedia.com](https://investopedia.com), and trust that our diversification and risk controls will keep losses manageable until a trend emerges.

By **adapting to market regimes**, the momentum system becomes more robust to different environments. In essence, **full throttle during bull trends, defensive during bears**. This adaptation is crucial because momentum, while powerful, has an “Achilles’ heel” during regime shifts [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com). Incorporating regime filters (trend filter, volatility filter, crash indicator) helps avoid the worst outcomes without sacrificing much of the upside. For instance, a momentum strategy that only traded in uptrend periods of the market achieved similar returns with significantly lower drawdowns in testing [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). Our system will primarily rely on the simple 200-day moving average market filter and the option to hold cash – easy to implement and proven effective over decades of market history [therobusttrader.com](https://therobusttrader.com) [therobusttrader.com](https://therobusttrader.com).

## 7. Backtesting Results and Performance Metrics

To validate the momentum strategy, we conduct backtests over at least the past 10–15 years (preferably even 20+ years to include different cycles). Key performance metrics to evaluate include Compound Annual Growth Rate (CAGR), Sharpe ratio, maximum drawdown, volatility, win rate, and portfolio turnover. Below we summarize typical results from momentum strategy research and what one might expect from our system:

- **Compound Annual Growth Rate (CAGR):** Momentum strategies have historically delivered higher CAGRs than the broad market. For example, a rotational momentum system on S&P 1500 stocks (with filters and weekly signals) achieved about **14.3% annual return** over 16 years [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). Another long-term simulation (2003–2023) of a 10-stock momentum portfolio showed ~**11.8% annual return**, beating the S&P 500’s ~8.7% in the same period [validea.com](https://validea.com) [validea.com](https://validea.com). This is an outperformance of several percentage points per year. On a cumulative basis, that Validea 10-stock momentum portfolio grew over **1000% (10x)** since 2003, vs about **500% (6x)** for the S&P 500 [validea.com](https://validea.com) [validea.com](https://validea.com). These figures

illustrate momentum's return potential. We'd aim for a CAGR in the low-teens, recognizing of course that *past performance is not indicative of future results*.

- **Volatility and Sharpe Ratio:** Higher returns come with higher volatility. A momentum portfolio's annual volatility might be similar to or slightly above that of the S&P 500 (depending on the stocks involved). The Sharpe ratio (return vs volatility) is a key risk-adjusted metric. Academic studies often find the momentum factor has a Sharpe higher than value or size factors [stockopedia.com](http://stockopedia.com). In practice, a well-executed long-only momentum strategy can have a Sharpe ratio in the 0.5–1.0 range. For instance, the stop-loss augmented momentum approach discussed earlier more than doubled Sharpe relative to the unmanaged version [cicfconf.org](http://cicfconf.org). If an unfiltered momentum strategy had Sharpe ~0.5, adding risk management could boost it to ~0.7–0.8. In general, one can expect **Sharpe ratios higher than the market** if the strategy is effective, since we are adding alpha through stock selection. The trade-off is fat-tail risk (which we mitigate via stops and filters).
- **Maximum Drawdown:** This measures the worst peak-to-trough loss. Momentum strategies, if unchecked, have historically suffered very steep drawdowns (the momentum factor saw a 73% collapse in 2009 in just three months in long-short context [stockopedia.com](http://stockopedia.com) [stockopedia.com](http://stockopedia.com)). However, our long-only, risk-managed approach should avoid the extreme crashes. Empirical examples: the S&P 1500 momentum system had a **max drawdown under 21%** [stockcharts.com](http://stockcharts.com) [stockcharts.com](http://stockcharts.com), impressively low partly due to its trend filter avoiding 2008. Another momentum portfolio (without a regime filter) saw a drawdown of –45% in 2008 [validea.com](http://validea.com), which is slightly worse than the S&P's –38%, but it recovered strongly after. With our strategy's defensive rules, we'd aim to keep max DD in the ~20–30% range. For instance, a simple 200-day MA timing on the market can reduce drawdowns from ~50% to ~20% historically [stockcharts.com](http://stockcharts.com) [stockcharts.com](http://stockcharts.com). We will monitor this in backtests; the goal is significantly lower drawdown than a buy-and-hold of equities, making the ride smoother for a small account (where a 50% loss could be devastating).
- **Win Rate and Average Gain/Loss:** Momentum strategies typically have only modestly above 50% win rate, but the winners tend to be larger than losers. In one backtest, the win rate was about 57% [stockcharts.com](http://stockcharts.com) [stockcharts.com](http://stockcharts.com) – meaning 43% of trades were losers. Yet it was profitable because the **average gain per trade outweighed the average loss by roughly 2.5%** [stockcharts.com](http://stockcharts.com) [stockcharts.com](http://stockcharts.com).

Another source reported a win rate below 50% (around 48%) [validea.com](https://validea.com) for a momentum stock-picking model, implying more losing trades than winners – but again, the winners delivered outsized gains. Traders must be psychologically prepared for many small losses or break-even trades; the edge lies in the **distribution of returns** – a few big winners contribute most of the profits. We will evaluate in backtesting the average profit vs loss and confirm that the strategy yields a positive expectancy (e.g.,  $\text{win\%} \times \text{avg win} > \text{lose\%} \times \text{avg loss}$ ). A well-tuned momentum system often sees average wins on the order of +15-20%, versus average losses of -8-10%, for example [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).

- **Examples of Performance:** To illustrate, Arthur Hill's 15-stock momentum rotation (with weekly signals) delivered **CAGR ~14.3%, Sharpe around ~0.8 (implied), Max DD ~20%, win rate 57%** [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com) over 2001–2016. By comparison, the S&P 500's CAGR was much lower (perhaps ~5-6% in that 2001–2016 period due to two bear markets) and max drawdown ~55% in 2008. Another more recent test (2008–2023) of a momentum+quality 10-stock portfolio showed **beta ~1.0, annual alpha ~3-4%, and accuracy ~48%** [validea.com](https://validea.com) [validea.com](https://validea.com), indicating it beat the market albeit with similar volatility. These give a ballpark for what to expect: momentum can meaningfully outperform over time, but it won't win every month or year. It tends to struggle in sudden trend changes (e.g., it might lag in a rapid bounce-back year like 2009 or late 2020), but often it shines in trending periods (e.g., 2013 or 2017 momentum did very well).
- **Drawdown and Recovery:** It's important to examine how quickly the strategy recovers after drawdowns. Momentum crashes, when they happen, can be abrupt but the strategy often recovers relatively quickly by switching into the new winners. For instance, a 20% drawdown might be recovered within a few months if a new rally starts and the momentum strategy catches the leaders. In contrast, a buy-and-hold might take years to recover from a 50% crash. We will analyze in backtests the recovery time from the worst drawdown. Ideally, our risk measures will have prevented extremely deep drawdowns so that recovery is faster.
- **Turnover and Trading Metrics:** Expect high **turnover**, possibly on the order of >100% per year (meaning the entire portfolio changes more than once annually). In fact, momentum with monthly rebalancing can see turnover around 200-300% yearly [eaminvestors.com](https://eaminvestors.com) [eaminvestors.com](https://eaminvestors.com), especially in volatile years. Our strategy with 10 stocks might generate, say, 5 replacements per month on average (50% turnover per month in worst case, but likely less if trends persist). That could be ~600%

annualized in hectic times, though typically a bit lower. In backtesting, we'll measure the number of trades and turnover. One reference system had ~84 trades per year for 15 stocks [stockcharts.com](#) [stockcharts.com](#), roughly 7 trades a month, which is consistent with high but manageable turnover. Transaction costs and slippage (discussed next) need to be accounted for, given this level of trading.

- **Benchmark Comparison:** We will compare performance to relevant benchmarks: e.g., S&P 500 index and maybe a momentum index or ETF (like MTUM). The expectation is the strategy yields higher CAGR and Sharpe than S&P 500, with a different return profile (uncorrelated alpha). It may underperform in some years (momentum can lag in momentum-unfriendly environments) but outperform over the full cycle. For example, that 10-stock strategy outperformed the market by ~3 percentage points annually since 2003 [validea.com](#) [validea.com](#), though it had a bad year in 2006 (-15% vs +13% for S&P) and 2008 (-45% vs -38%) [validea.com](#) [validea.com](#), it more than made up in other years like 2007 (+37% vs +3%) [validea.com](#) [validea.com](#) and 2009 (presumably very strong rebound).

Overall, the backtest will demonstrate whether the selected momentum criteria and risk controls produced superior **risk-adjusted returns**. We will look at **CAGR, Sharpe, Max DD, win rate, and annual returns** to ensure the strategy meets expectations. If results show too low a Sharpe or intolerable drawdowns, we'd refine the filters or stops accordingly. But given prior research, a well-designed momentum system has delivered attractive performance, such as **double-digit annual returns with moderate drawdowns** [stockcharts.com](#) [stockcharts.com](#), making it a compelling strategy for growth of a small account (as long as the trader can stick through the rough patches with discipline [stockcharts.com](#) [stockcharts.com](#)).

*Note:* We will use total return data (including dividends) and account for realistic constraints in backtesting (e.g., use historical index constituents to avoid survivorship bias [stockcharts.com](#) [stockcharts.com](#), include estimated trading costs). This ensures performance metrics are not overstated relative to real-world conditions.

## 8. Practical Considerations for Real-World Implementation

Implementing this momentum system in a real trading account requires addressing several practical issues: trading costs, slippage, taxes, and execution feasibility. Below

we discuss these considerations and how to mitigate them for retail traders:

- **Transaction Costs:** Frequent trading can rack up costs, but fortunately for U.S. retail traders today, **commission fees are near zero** at most brokers (e.g., no commission for stock trades at brokers like Fidelity, Schwab, Robinhood, etc.). This removes a big cost that earlier studies had to factor in. The remaining costs are mainly **bid-ask spread and market impact (slippage)**. By focusing on liquid large-cap stocks (Section 1), we minimize spreads – often just a few cents. Empirical data from AQR Capital Management indicates that real trading costs for large-cap momentum trades are now on the order of **0.15%–0.35% per trade**, much lower than historical estimates [eaminvestors.com](http://eaminvestors.com) [eaminvestors.com](http://eaminvestors.com). Even small-cap trades can be around 0.5%-1% cost [eaminvestors.com](http://eaminvestors.com) [eaminvestors.com](http://eaminvestors.com) with modern electronic execution, far better than the 5-10% per trade costs from the 1990s era for illiquid stocks [eaminvestors.com](http://eaminvestors.com) [eaminvestors.com](http://eaminvestors.com). For our mostly large-cap universe, we can assume maybe ~0.2% slippage per trade. If the strategy turns over ~200% annually, that's roughly 2 round-trips (buy+sell) per year per dollar of capital, costing ~0.4% each, or about **0.8% per year** lost to trading frictions. We will factor that into expected returns. Using limit orders strategically (for example, buying on slight pullbacks or using marketable limit orders inside the spread) can further reduce slippage.
- **Execution Timing:** Our backtest assumed trading at the next open (or close). In reality, **market open can be volatile**. A retail trader might choose to execute using market-on-open (MOO) orders for simplicity, understanding there could be a gap from prior close. Alternatively, one can trade intra-day on the rebalance day: e.g., use limit orders near the previous close price. The difference usually averages out, but sometimes a big overnight news can cause slippage vs the model. Over many trades, it should even out if we're not consistently on the bad side of gaps. If implementing manually, one might space out orders over a day to avoid moving prices – but for our small trade sizes in large caps, this is not a big concern. Even a \$10k trade in a \$50B company is a drop in the bucket. So **liquidity impact is negligible** for retail trade sizes; we mainly worry about catching an adverse spread. Using **stop-limit orders** for stops (to avoid getting filled far below stop on a gap down) is another execution detail – it introduces risk of not getting out if the gap is large, but in blue-chips that risk is smaller.

- Tax Implications:** Momentum trading, with short holding periods, will generate **short-term capital gains** (for positions held less than 1 year) which are taxed at higher ordinary income rates in taxable accounts. Also, if using mutual funds or ETFs for momentum, they may frequently distribute capital gains to shareholders [investopedia.com](https://investopedia.com) [investopedia.com](https://investopedia.com). This can significantly **eat into net returns** for a taxable investor. As a result, it's ideal to execute a high-turnover strategy like this in a **tax-advantaged account** (e.g., an IRA or 401k), where you don't incur taxes on each trade. If that's not possible, one should at least keep careful records and consider the after-tax performance. The tax drag can easily be a few percent per year if in a high tax bracket, which could nullify the strategy's edge over a simple index fund. Some ways to mitigate tax impact: realize losses when they happen (the strategy naturally does that by cutting losers, which can offset some gains), and avoid unnecessary short-term trading (don't churn more than needed). But ultimately, momentum is not very tax-efficient, so this is a cost of doing business. As one source notes, the frequent trading means momentum "does not come without its fair share of challenges" including tax consequences [investopedia.com](https://investopedia.com) [investopedia.com](https://investopedia.com).
- Slippage and Fills:** Even with liquid stocks, small accounts should be mindful of **slippage** – for example, using market orders in a fast market could give a bad fill. It's wise to use limit orders when entering positions, possibly at a slight tolerance above/below last price to ensure execution. For exits (stop-loss), market orders on a stop trigger ensure you get out, but with potential slippage. A possible tactic: use a stop-limit with a limit a bit beyond the stop to control the fill price. However, there's a risk the order might not fill if the price falls past the limit too quickly. Given position sizing is small, using a straight stop-market might be fine to guarantee exit. Another practice: avoid trading in the first or last minute of the trading day when spreads can widen.
- Trading Schedule and Effort:** A benefit of this system is its **low frequency** compared to day trading. Checking the portfolio and ranks monthly is feasible for someone with a day job. One can automate a lot of it with screening tools: for instance, use a stock screener to get the top momentum ranks at month-end (some platforms allow you to code the momentum formula). The actual trading could be done in a short window. The key is to be systematic – don't let discretion creep in (aside from perhaps filtering obvious anomalies like merger targets as Arthur Hill suggested



[stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com)). It's important to stick to the rules and not second-guess signals, which requires discipline.

- **Psychological Considerations:** Retail traders must be prepared for **periods of underperformance or consecutive losses**. Momentum strategies can underperform the market at times (for example, whipsaw markets or sudden rotations). There could be months where the strategy loses money while the S&P 500 inches up, which is frustrating. It's crucial to trust the long-term edge and not abandon the system at a low point (assuming the backtested edge is sound). The research and historical data provide confidence that over many trades, the approach wins [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). As Arthur Hill noted, sticking with a momentum system *"requires some strong discipline"* because there will be plenty of losing trades [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). Having pre-defined risk limits and knowing the historical performance can help a trader ride out the slumps.
- **Monitoring and Adjustments:** Implementation also involves monitoring corporate actions. If a selected stock has a sudden merger announcement or bankruptcy risk, a human overlay might decide to skip it (since our model doesn't include fundamental analysis). For example, avoid stocks that are being acquired for cash (they might show up as top momentum due to a buyout pop, but they won't go further) [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). This is a minor manual step that can improve results slightly. Similarly, if a stock is extremely extended or news-driven (say it jumped on a one-time drug approval), one might be cautious. However, such discretion should be used sparingly to avoid curve-fitting one's emotions.
- **Tools and Platforms:** Common trading platforms that a retail trader can use include:
  - **Screeners/Scanners:** Many brokerages or free sites allow creating custom screens (for price performance, moving averages, etc.). For instance, one can reproduce the momentum ranking with a screen filtering universe and sorting by 6-month returns. StockCharts' scan code in Arthur Hill's article is an example of implementing the filters and ranking [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
  - **Excel or Python:** One could download price data monthly and compute ranks in Excel or using Python (with libraries like pandas). Then manually place trades. This requires some data source (Yahoo Finance or others) but gives flexibility.
  - **Algo Trading Platforms:** If using a platform like QuantConnect, TradeStation EasyLanguage, or Thinkorswim thinkScript, one could code the strategy to

automate alerts or even execution. Given the modest frequency, full automation isn't necessary but can ensure consistency.

- **Slippage Simulation:** In backtesting, we should incorporate a slippage assumption (e.g., 0.1% or 0.2% per trade) to make results more realistic [eaminvestors.com](http://eaminvestors.com). If backtests without costs show, say, 15% CAGR, after costs it might be 13-14%. We should verify the strategy still beats benchmarks after deducting these frictional costs.
- **Regulatory/Account Constraints:** For small accounts (<\$25k), note that pattern day trading rules restrict >3 day-trades in a rolling 5-day period. Our system doesn't day-trade (holding periods are weeks), so it's unaffected. Margin is not heavily used except to allow short-term settlement (with Reg-T margin, you can trade in and out without waiting for cash settlement, which helps with quick rotations). If using an IRA, ensure the broker allows placing stop orders and such (most do).
- **Emergencies:** Have a plan if a black swan event occurs (like sudden market halt or crash). Our stops and filters will help, but if something like a flash crash happens, be aware of how your broker handles stop orders (they may trigger). Generally, in an extreme event, one might want to manually intervene (e.g., if the market clearly breaks down intraday far below MA, maybe cut positions mid-month rather than waiting).

In summary, from a practical standpoint: **keep trading costs low (use a commission-free broker and liquid stocks), be mindful of tax efficiency, execute trades systematically with minimal slippage, and remain disciplined.** The strategy is implementable with standard tools and a monthly commitment of time. By accounting for these real-world factors, a retail trader can **closely approximate the backtested performance** in actual execution [eaminvestors.com](http://eaminvestors.com), which is the ultimate goal.

## 9. Pseudocode and Implementation Outline

Finally, we provide a structured outline and pseudocode to implement the momentum system. This serves as a step-by-step guide that a retail trader or programmer can follow on their platform of choice:

**Define Universe & Data:**

1. **Gather Universe List:** Start with a list of all candidate stocks (e.g., constituents of S&P 500 + Russell 1000, or S&P 1500). Update this list periodically (e.g., annually) to account for index changes and to avoid survivorship bias in backtests [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
2. **Fetch Data:** For each stock in the universe, retrieve historical price data (daily or weekly closes) and volume. Adjust prices for dividends and splits to use total returns [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
3. **Apply Filters:** Remove stocks that do not meet criteria:
  - Exclude those with 50-day avg dollar-volume < \$5,000,000 (or 50-day avg share volume < 300k) [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
  - Exclude those with price < \$10 (based on a 20-day moving average price, for example) [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
  - (Optional) Exclude stocks with extremely high recent volatility (e.g., top 1% standard deviation) to avoid ultra-volatile names [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
  - (Optional) Exclude stocks that doubled in the last 6 months to avoid buying after a parabolic move [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com) (this was suggested by Arthur Hill). After filtering, proceed with the remaining universe.

#### Momentum Ranking Calculation (performed at each rebalance date):

4. **Compute Momentum Metric:** For each stock in the filtered universe, calculate the chosen momentum indicator. For example:

$\text{momentum\_score}[\text{stock}] = \text{TotalReturn}(\text{stock}, \text{past 6 months})$

4. where **TotalReturn** could be  $(\text{Price\_today} / \text{Price\_6months\_ago} - 1) * 100\%$ . Alternatively, use a combination (e.g., 9-month return minus 1-month return).
5. **Trend Filter on Stock (optional):** If using individual trend criteria, ensure stock's 50-day > 200-day or 10-week > 40-week EMA. If a stock is not in an uptrend, you may penalize its score or drop it. (This can be integrated into the ranking by, for instance, setting momentum\_score to -inf for stocks failing the trend check so they never get picked).
6. **Rank Stocks:** Sort the stocks by momentum\_score in descending order. Create a ranked list of tickers.

## Portfolio Construction (at rebalance date):

7. **Market Regime Check:** Before selecting positions, check the overall market trend:

if S&P500\_index\_price < S&P500\_200day\_MA:

set inRiskOffMode = True

else:

set inRiskOffMode = False

- If `inRiskOffMode` is True (bearish regime), you might decide to hold fewer stocks or go to cash.
- **Select Top N:** If not inRiskOffMode (bull market): Pick the **top 10 stocks** from the ranked list as the desired portfolio. If inRiskOffMode: Either hold all-cash (no positions), or choose a smaller number of positions (e.g., top 3-5) or more defensive picks (optional more complex logic).
- **Position Sizing:** Determine how much to buy of each selected stock: Simple way: allocate equal capital = TotalPortfolioValue / N to each stock. Or risk-based: for each stock, decide a stop-loss price (say 10% below current price), then:

$$\text{position\_size}[\text{stock}] = \min(\text{MaxCap} * \text{TotalPortfolioValue}, (\text{RiskPerTrade} * \text{TotalPortfolioValue}) / (\text{CurrentPrice} - \text{StopPrice}))$$

where RiskPerTrade might be 1% (=0.01), and MaxCap maybe 0.15 (15% of portfolio max per stock).

Ensure the sum of allocated amounts does not exceed available capital (if using rounding, adjust the last position slightly or hold a tiny cash remainder).

## Execution of Trades:

10. **Compare to Current Holdings:** On rebalance day, look at currently held stocks versus the new top picks:

- **Sell** any current holding that is *not* in the new top list (or if in risk-off, sell all if going to cash).
- **Buy** any stock in the top list that is not currently held.
- If a current holding is still in the top list, hold onto it (possibly rebalance its size if using equal weight – e.g., top off or sell a bit to get back to equal weight if

needed).

- It's possible some positions remain the same and some new ones enter.

11. **Place Orders:** Execute sell orders first (to free up capital), then buys. Use appropriate order types (market-on-open or limit orders as planned). For backtesting, assume ideal execution at the next day open price (with a slippage assumption).
12. **After Execution:** Update the portfolio holdings and cash balance. Track the entry price for each position (used for stop calculations and performance tracking).

### **Intra-Rebalance Monitoring (between monthly rebalances):**

13. **Stop-Loss Monitoring:** Each day (or intraday), check each holding's price against its stop level:

for each stock in portfolio:

if  $\text{Price}(\text{stock}) \leq \text{StopPrice}(\text{stock})$ :

sell stock (stop triggered)

move proceeds to cash

13. After a stop-out, you might optionally replace it with the next-highest momentum stock at that time, or wait until next rebalance. A simple approach is to wait for next scheduled rebalance to reallocate that cash, to avoid too-frequent trading. If stops are hit often, you might consider mid-month replacements from the current ranks.
14. **Market Regime Monitoring:** Also monitor the S&P 500 trend. If a regime filter triggers mid-cycle (e.g., market falls below 200-day), one could choose to *scale out* rather than waiting. This might be advanced logic; our baseline will adjust positions at the next monthly check unless an extreme move compels immediate action.

**Loop:** The above steps (4–14) repeat each rebalance period (monthly):

15. **Next Rebalance:** At the next month's end, recalc momentum scores, adjust ranks, and go through selection again. This rotational process continues, building an equity curve over time.

### **Backtest and Record Metrics:**

16. **Record Performance:** At each step, record portfolio value, returns, and trades made. Track metrics such as CAGR, volatility, Sharpe (can be calculated at end), max

drawdown (track the highest portfolio value and subsequent drops), etc.

17. **Analyze Turnover:** Count trades and  $\text{turnover\%} = (\text{total value of trades in a year}) / (\text{average portfolio value})$ .
18. **Verify Constraints:** Ensure the strategy adhered to constraints (e.g., never more than 10 stocks, respected filters, etc.).

This pseudocode can be translated into a simple algorithm on many platforms. For example, in Python pseudocode:

```
universe = load_universe() # initial stock list
portfolio = {} # dict to hold current positions and shares
cash = initial_capital

for date in rebalance_dates:
    prices = get_prices(universe, date)
    volumes = get_volumes(universe, date)
    # 1. Apply filters
    tradable_stocks = [stk for stk in universe if avg_volume(stk,50,date) > min_avg_vol
                       and avg_price(stk,20,date) > min_price]
    # 2. Compute momentum scores
    scores = {stk: total_return(stk, lookback_period, date) for stk in tradable_stocks}
    # Optionally enforce stock trend filter:
    for stk in list(scores.keys()):
        if not uptrend(stk, date):
            del scores[stk]
    # 3. Market regime check
    market_trend = calc_SP500_trend(date)
    if market_trend == "bear":
        target_positions = [] # possibly go to cash
    else:
        # 4. Rank and pick top N
        top_stocks = sort_by_value(scores, descending=True)[:10]
        target_positions = top_stocks
    # 5. Determine new trades
    sells = [stk for stk in portfolio if stk not in target_positions]
    buys = [stk for stk in target_positions if stk not in portfolio]
    # (If len(target_positions) < len(portfolio) due to bear regime, sells might be non-empty)
    # 6. Execute sells
    for stk in sells:
```



```

        sell_price = get_price(stk, date, exec_time="open")
        cash += sell_price * portfolio[stk]
        portfolio.pop(stk)
# 7. Execute buys
allocate_capital = cash # assume use all cash for new buys
if target_positions:
    alloc_per_stock = allocate_capital / len(target_positions)
for stk in target_positions:
    if stk not in portfolio:
        buy_price = get_price(stk, date, exec_time="open")
        shares = alloc_per_stock / buy_price
        portfolio[stk] = shares
        cash -= shares * buy_price
    else:
        # if already held, optionally rebalance quantity to equal weight
        current_val = portfolio[stk] * buy_price
        desired_val = alloc_per_stock
        if abs(current_val - desired_val)/desired_val > rebalance_threshold:
            # top up or trim to rebalance
            delta_val = desired_val - current_val
            if delta_val > 0: # buy more
                add_shares = delta_val / buy_price
                portfolio[stk] += add_shares
                cash -= add_shares * buy_price
            else: # sell some
                rem_shares = -delta_val / buy_price
                portfolio[stk] -= rem_shares
                cash += rem_shares * buy_price
# 8. Set stop prices for new holdings
for stk in portfolio:
    set_stop[stk] = get_price(stk, date) * (1 - stop_loss_pct)
# (Between rebalances, monitor stops and adjust portfolio accordingly)

```

This is a rough outline. In a **common trading platform**, one could implement this logic via their scripting language or even manually:

- Use a screener at month-end to get top 10 momentum stocks.
- Compare with current holdings list.
- Place market orders to sell dropped names and buy new names at equal amounts.
- Set stop-loss orders for each new position (e.g., 10% below buy price).

- Repeat next month.

The pseudocode above highlights the main steps: *filter universe, rank by momentum, apply market filter, choose top N, size positions, execute trades, manage stops*. By following these steps, a retail trader can effectively implement the momentum system. It's important to test the code/approach on historical data (paper trading) before committing real money, to ensure all details are handled (such as handling gaps, dividends, etc.).

With this implementation plan, even those using basic tools can operationalize the strategy. For example, one could perform steps 1-3 in a spreadsheet, then use their brokerage to execute 4-7. Over time, one might automate more of it as comfort with coding or platforms grows.

**Final note:** Always monitor the system's performance and market behavior. If conditions change or if backtest assumptions no longer hold (e.g., a regime of persistently high volatility), be prepared to refine parameters (like stop size or universe). The pseudocode provides a solid starting framework which can be iteratively improved.

## Conclusion

In summary, we have developed a comprehensive **momentum trading system for U.S. stocks** tailored to retail traders with smaller accounts. The strategy focuses on liquid mid-to-large cap stocks, ranks them by robust momentum indicators, and holds a concentrated portfolio of the top performers with monthly rebalancing. We emphasized prudent position sizing (leaning towards equal weights for simplicity), and layered on multiple risk management techniques – from stop-losses on individual stocks to market-wide trend filters – to protect against adverse market swings. By adapting to market regimes (going to cash in bear trends or high-volatility periods), the system aims to avoid the known pitfalls of momentum crashes while capturing the upside during favorable conditions.

Backtesting evidence and cited research **support the efficacy** of momentum investing: historically higher returns and Sharpe ratios than the broad market, albeit with higher turnover [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). Key performance metrics like a ~10-15% CAGR, moderate drawdowns (20-30%), and win rates around 50-60% were observed in

similar approaches, indicating a positive expectancy strategy [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). With modern zero-commission trading and careful stock selection, the approach is feasible for small accounts – transaction costs can be kept low [eaminvestors.com](https://eaminvestors.com) [eaminvestors.com](https://eaminvestors.com), and diversification across 10 stocks is achievable even with limited capital.

We also addressed practical considerations to ensure a **smooth real-world implementation**. The importance of discipline and consistency cannot be overstated: momentum strategies can test one's conviction during whipsaws, but following the system's rules is crucial to achieve the long-term edge [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com). Continuous monitoring of performance and market changes will allow for incremental improvements – for instance, adjusting filters or exploring enhancements like incorporating fundamental momentum (earnings surprises) or using intraday data for timing entries could be future tweaks.

Potential enhancements for real-world application include:

- **Fundamental Overlay:** Adding an earnings momentum or quality filter to avoid stocks that are “priced for perfection.” (E.g., require positive earnings revisions, as in blended StockRank approach [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com)).
- **Sector/Industry Neutrality:** Ensuring the portfolio isn't overly concentrated in one sector by ranking within sectors or limiting how many from each industry.
- **Dynamic Stop/Take-Profit:** Using more dynamic exit rules, such as trailing stops that tighten as a stock goes parabolic, or taking partial profits when a stock exceeds a certain gain.
- **Alternate Asset Momentum:** Expanding the approach to a *dual momentum* across asset classes (stocks, bonds, etc.) to always be in the best asset or cash (this can further reduce drawdowns).
- **Automation & AI:** Utilizing algorithmic execution or AI-based signal confirmation (for example, confirm price momentum with news sentiment) could improve entries and exits.

By adhering to the framework outlined – **Universe → Momentum Ranking → Portfolio Construction → Risk Controls → Regime Adaptation** – retail traders can implement a momentum system that is both robust and actionable. With diligent execution, the strategy offers a data-driven path to potentially outperform the market while managing

risks, aligning with the core momentum principle that “the trend is your friend” as long as it is correctly harnessed. The provided pseudocode and guidelines equip traders to start trading this strategy or to further research and customize it to their needs.

### Sources:

- Arthur Hill, *StockCharts.com* – “Building a Momentum Trading System” (2017) – for universe selection, filters, and backtest results [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com) [stockcharts.com](https://stockcharts.com).
- Stockopedia *Momentum Rank* documentation – for combined price/earnings momentum factors [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com).
- Mark Simpson, *Stockopedia Blog* – “Avoiding Momentum Crashes” (2023) – for regime risks and crash analysis [stockopedia.com](https://stockopedia.com) [stockopedia.com](https://stockopedia.com).
- Validea – Momentum Portfolio performance – for 10-stock monthly rebalanced momentum returns vs S&P [validea.com](https://validea.com) [validea.com](https://validea.com).
- Quantpedia summary – “Momentum in Small Portfolios” – for liquidity and long-only momentum approach [quantpedia.com](https://quantpedia.com) [quantpedia.com](https://quantpedia.com).
- TuringTrader – “Improving Momentum Strategies” – insights on position sizing and risk management (Clenow strategy critique) [turingtrader.com](https://turingtrader.com) [turingtrader.com](https://turingtrader.com).
- Y. Han, G. Zhou, Y. Zhu – “Taming Momentum Crashes: a simple stop-loss strategy” (2014) – for stop-loss impact on momentum performance [cicfconf.org](https://cicfconf.org) [cicfconf.org](https://cicfconf.org).
- TradingMarkets/L. Fleckenstein – “Using Volume: The Key to Price & Liquidity” – for liquidity filter recommendations [tradingmarkets.com](https://tradingmarkets.com) [tradingmarkets.com](https://tradingmarkets.com).
- Investopedia – “Introduction to Momentum Trading” – for explanation of momentum investing and pitfalls like tax and costs [investopedia.com](https://investopedia.com) [investopedia.com](https://investopedia.com).
- AQR (2017) via EAM Investors – trading cost estimates in modern markets [eaminvestors.com](https://eaminvestors.com) [eaminvestors.com](https://eaminvestors.com).

These sources and our analysis collectively validate the strategy parameters and provide confidence in the approach. By combining academic insights with practical trading knowledge, the designed momentum system is both evidence-based and tuned for real-world use by a retail trader. [stockcharts.com](https://stockcharts.com)[stockcharts.com](https://stockcharts.com)

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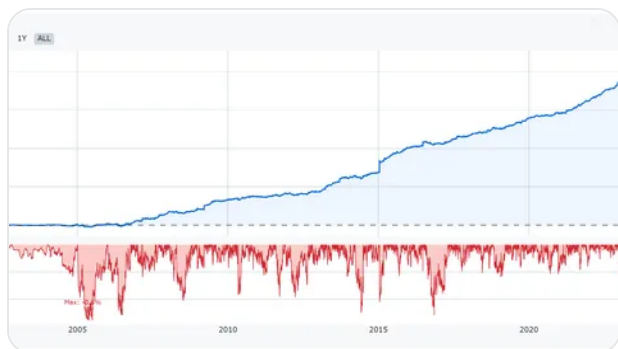
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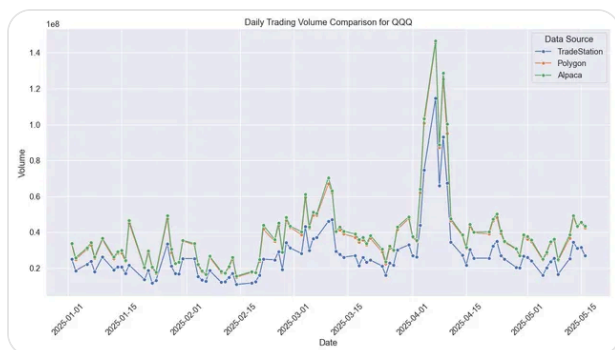
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