Insights

Our Approach to Quantitative Investing

In our previous discussion, we briefly introduced the general concept of quantitative investing. In this write-up, we will explore in greater detail the quantitative strategy our fund employ. Our quantitative investment strategy (QVM model) employs multi-factor model to identify stocks with a historically proven combination of strong momentum, attractive valuations, and consistent profitability.

Why QVM?

Previously, we outlined several investment factors known to drive excess returns in equities, including size, value, momentum, quality, and low volatility. Pioneering research such as Campbell Harvey and Yan Liu's 2015 study, "A Census of the Factor Zoo," catalogued over 300 potential factors, underscoring the complexity of this field (Harvey, Liu, & Zhu, 2016). Despite the plethora of factors identified, it is widely acknowledged that only a select few significantly impact returns. This sentiment is echoed in Dacheng Xiu's 2017 paper, "Taming the Factor Zoo: A Test of New Factors" (Xiu, 2017), which posits that only a handful of factors are crucial for explaining individual stock returns—a finding corroborated by Alex Rubesam's 2018 analysis in "Searching the Factor Zoo" (Rubesam, 2018).

At our fund, we strategically focus on a core set of factors that we believe are most predictive of future performance:

1. **Quality**: Identify companies that are financially healthy and operationally efficient. This helps ensure that the company's success is sustainable and not merely a result of short-term market fluctuations or financial engineering. Metrics such as high return on equity, stable year-over-year earnings growth, and strong profit margins are often used.
2. **Value:** Focuses on stocks that appear underpriced compared to their fundamental worth, as indicated by ratios like price-to-earnings, price-to-book and price-to-sales. This factor is grounded in the long-standing investment principle of buying low and selling high. It is based on the idea that market occasionally underestimates the true value of a company due to various reasons, such as market overreactions. This provides a margin of safety and potential significant upside as the market corrects its initial mispricing.
3. **Momentum:** Looks for securities that have had higher recent return performance compared to other securities. This can be measured by looking at past 6 to 12 months performance. The underlying assumption is that securities which have performed well in the recent past are likely to continue their strong performance in the near future, driven by investor sentiment and market dynamics.

We chose to focus on this set of core factors as they are supported by extensive empirical research and historical data demonstrating their effectiveness across various markets and conditions. Each factor is based on clear, logical economic principles, reflecting the approaches we adopt in our other strategies: long-only investment and tactical trading portfolios. Furthermore, when these factors are used in combination, they offer diversification benefits, as each of these factors tend to excel differently in different market cycles — Value stocks typically perform well during economic recoveries, Momentum stocks thrive on continuing trends, and Quality stocks provide stability during downturns due to their consistent earnings.

Portfolio Construction

Portfolio Construction Approach: Top-down vs Bottom-up

Multi-factor portfolios can be constructed in various manners, two of which are:

- **Top-down construction:** Involves assembling a portfolio from single-factor portfolio "sleeves". This approach allows for precise control over each factor's exposure but may lead to dilution effect, which occurs because the combination of different factor sleeves might not always align perfectly, potentially reducing the intensity of any single factor's influence on the overall portfolio performance.
- **Bottom-up construction:** Utilises a "composite factor" approach in which individual factor scores are combined to form a composite factor. This approach tends to enhance factor integration, reducing the risk of dilution since each investment is evaluated and included based on its overall factor efficacy rather than individual factor attributes.

We have opted for the bottom-up construction approach due to our focus on maximising alpha via reaping the synergistic effects of combining factors at the security level.

Dynamic Factor Tilt

We recognised that factors perform differently at different periods. Dynamic factor tilt is our attempt to time the factor exposure. The most common approach of tilting factor exposure is based on looking at the valuation spreads of the individual factors, over-allocating to factors that have wide valuation spreads, and underweighting those with narrow spreads. With that said, we have to be cognizant of the fact that valuation spreads can remain unusually wide or narrow for extended periods, often driven by macroeconomic trends, market sentiment or regulatory changes (Asness, Moskowitz, & Pedersen, 2013). Therefore, while these spreads can signal potential reversion opportunities, relying solely on them to adjust factor exposures requires careful consideration of the broader economic context.

Sector-neutralised

Given our focus of maximise returns over capturing broad market returns or to reduce volatility, we do not sector-neutralise our multi-factor portfolio, but instead, allow the strategy to tilt towards certain sectors that are deemed to have the relative higher factor compositive scores. With that said, we are still prudent in avoiding extreme allocation to specific industries and have imposed a maximum sector allocation cap to address industry concentration risks.

Stock Weighting: Equal-weighted

With regards to individual stock weighting, we did not have any luck in finding any weighting methodology that offer meaningful value over the naïve equal-weighted approach, which has shown to be quite robust. Consequently, we have opted to allocate weights naively and equally across all stocks within the same market. This strategy simplifies the allocation process and ensures that no single stock disproportionately influences the portfolio's performance.

Rebalancing Strategy

Different factors have varying durations for optimal performance. Momentum factors, for instance, are known to react and adjust more quickly compared to Quality and Value factors. The concept of rebalancing timing luck—where the performance of a factor portfolio can significantly diverge based on the arbitrary rebalancing dates—plays a crucial role in portfolio management. According to research highlighted by Corey Hoffstein, Nathan Faber, and Steven Braun Rebalancing Timing Luck, the timing of rebalances can substantially affect the realized performance due to the different characteristics of portfolio construction choices (Hoffstein, Faber, & Braun, 2020).

To mitigate the impact of rebalancing timing luck, we have implemented a staggered rebalancing approach for our QVM portfolio. This involves dividing the portfolio into three sub-portfolios, each rebalanced quarterly but on different months. This strategy not only helps in managing the idiosyncrasies associated with each factor's reaction time but also enhances the adaptability of our strategy to sudden and significant changes in the QVM composite scores.

Cash Management & Event-based Rebalancing

The early versions of our QVM strategy included tactical cash management and adopted dynamic rebalancing approach. Tactical cash management involved adjusting the overall portfolio exposure based on market timing measures to mitigate market risk and volatility. This approach, while initially valuable, has become less critical as we expand our market universe. As our "fishing pond" enlarges, the need to manage the overall beta of our portfolio through cash management diminishes. Meanwhile, event-based rebalancing was designed to create a more responsive portfolio to shifts in market sentiment.

However, as we incorporate more markets into our universe, the relevance of these strategies has decreased. With a broader market scope, we can now remain fully invested, dynamically allocating resources across different markets based on their current attractiveness without maintaining a cash reserve. This flexibility, coupled with the reduced correlation across diverse geographic markets, enhances our geographical diversification and mitigates the idiosyncratic risks associated with any single market. One might question the approach during a financial crisis when correlations typically converge. Acknowledging this, we maintain a stringent quality and value score requirement for our holdings within the QVM portfolio. These defensive characteristics are strategically chosen to provide resilience during turbulent times, ensuring our portfolio is well-positioned to withstand market upheavals.

Risk Management

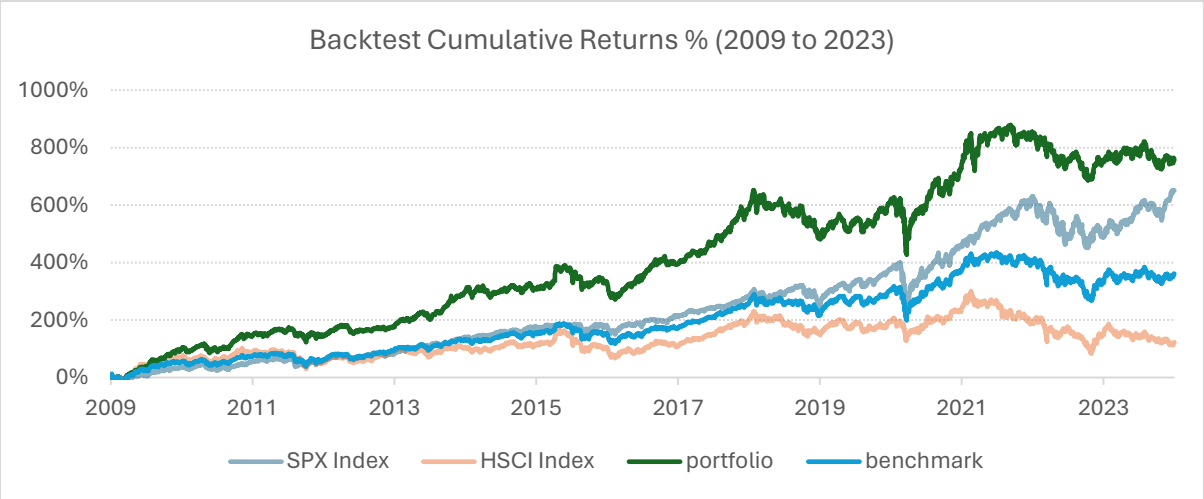
The QVM portfolio is subject to several risks that necessitate comprehensive management strategies. One primary concern is the portfolio's adherence to a fixed rebalancing schedule, which may restrict its ability to respond swiftly to significant events such as key earnings announcements or shifts in industry-specific regulations. Additionally, unlike the traditional bottom-up investment approach, which relies on in-depth research including direct interactions with company management and detailed financial modeling, the quantitative approach prioritizes efficiency and objectivity. It eliminates personal biases by systematically processing extensive data across many companies to uncover investment opportunities that yield excess returns across a substantial sample size. To mitigate these risks, we have implemented several guardrails. These include: **1) setting limits on sector exposure**, 2**) enhancing diversification across portfolios and markets**, and **3) maintaining strict thresholds for quality and value factor scores**, just to name a few. Furthermore, adopting a **staggered rebalancing strategy of multiple sub-portfolios** allows for greater flexibility and responsiveness than is possible with a single, fixed quarterly rebalancing schedule. This approach enables the portfolio to adapt more fluidly to market changes and potential opportunities.

Backtest Performance

Foremostly, treat all backtested results with a pinch of salt. We can cherry-pick periods and specifications of the model to make the backtest results look good, but to do this would be akin to deceiving everyone, including ourselves. Paradoxically, this is also one of the better ways to convince investors of any new strategy, especially when the strategy is grounded in long-standing investment principles supported by extensive research and studies.

Included in Appendix 1 are some guidelines and good practices that we follow when are backtesting a strategy. (**Appendix 1:** *Guidelines/Good Practices when Performing Backtests & Interpreting Results*)

For what it's worth, we have included a set of backtest result of our multi-factor quantitative investment strategy for reference.



15-YEAR BACKTEST PERFORMANCE (2008 to 2023)				
	1	2	3	4
	Portfolio	Benchmark*	SPX Index	HSCI Index
Total Return %	756.9%	360.9%	650.4%	122.9%
Ann. Return %	14.6%	10.3%	13.8%	5.3%
Ann. Stdev %	15.0%	15.4%	18.1%	21.3%
MDD %	-29.9%	-31.2%	-33.8%	-54.5%
Sharpe[1]	0.98	0.67	0.76	0.25

** Portfolio performance is simulated accounting for transaction costs & slippage, not adjusted for dividends.*

** Benchmark is specified as equal-weight allocation between HSCI & SPX Index.*

1. Sharpe ratio is computed based on US 10-year Treasury yield (USGG10YR Index)

Observations

The backtest performance for the 15-year period from 2008 to 2023 showcases the comparative returns of the QVM portfolio against the immediate benchmark and the S&P500 index. In terms of annualised returns, the QVM portfolio outperformed the immediate benchmark (equal-weight between SPX and HSCI index) and SPX by ~4% and ~1% respectively. In terms of risk-adjusted return as measured by Sharpe, the outperformance was greater due to the portfolio's lower standard deviation of returns.

The maximum drawdown (MDD), another measure of risk, for the portfolio was -30%, which also compares favorably against the MDDs of the benchmark and even the S&P500 Index of -31% and -34% respectively.

Our Approach to Quantitative Strategy Development & Improvement

In this section, we will briefly describe our takeaways and considerations when developing the quantitative strategy.

- **Challenges of Outperforming the SPX Index:** The SPX Index, renowned for its robust performance, sets a high benchmark that is notoriously difficult to surpass. Consequently, we often mentally benchmark our performance against the SPX

Index (or any other better performing market index) as a foundational reference point from which to strive for added value

- **Trade-offs and Rare Changes:** Modifying investment models involves inherent trade-offs, balancing potential improvements against the risks of unintended consequences. Due to these complexities, major changes to our investment strategies are made sparingly. This cautious approach ensures that any adjustments we make to the model are well-considered and backed by robust analysis.
- **Preference for Simplicity:** We tend to favor simple approaches over complex ones as, more often than not, simple approaches have shown to be more robust and generalisable out-of-sample. We prefer picking low-hanging fruits over reinventing the wheels.
- **Preference for Incremental Improvements:** We tend to favor making small, incremental improvements based on thorough testing and validation rather than large, disruptive changes.
- **Model/Data Accuracy vs. Practicality:** "It's better to be roughly right than precisely wrong" – This principle highlights the importance of making well-grounded, approximate decisions over overly precise but potentially misguided ones. Balancing the desire for precision with data imperfections is crucial, in this case, we can afford to accept dirtier financial data given the holding period of the strategy and the diversification across securities and markets. The belief is that with a decent sample size, we can achieve reliable and meaningful results even if our models or data are not perfectly precise, as long as they are fundamentally sound.
- **Circle of Competence:** We would rather work within our circle of competence, while seeking to expand that circle.

Conclusion

At AGT Partners, our commitment to quantitative multi-factor strategies is far from static. We view our QVM portfolio not as a passively managed product but as a living strategy, constantly refined to better capture market dynamics and investor needs. Unlike conventional wealth management offerings, which often remain unchanged once they reach the market, our approach is iterative. We continuously seek to enhance our methodology, be it through incorporating new findings from the ongoing evolution of financial research or responding to changing market conditions. This proactive stance ensures our strategies not only remain relevant but also maintain their edge in a competitive landscape. This approach mirrors our philosophy across all investment activities, where learning and adaptation are at the core of what we do, ensuring that our strategies are robust, responsive, and aligned with our clients' long-term investment goals.

APPENDIX

APPENDIX 1: Guidelines/Good Practices for Performing Backtests & Interpreting Results

- **Varying test periods:** Analyze the strategy's performance over multiple backtest periods of varying periods to ascertain its robustness. While longer backtest periods can provide a more comprehensive view of how a strategy performs across different market cycles and conditions, it's important to recognize that they may also include periods of data that are no longer relevant to current market dynamics. Additionally, shorter periods can be useful for understanding how a strategy might react to more recent and possibly more volatile market conditions, but they may not capture the full effects of longer-term trends and cyclical shifts. Therefore, using a combination of both long and short testing periods ensures a more balanced evaluation of a strategy's effectiveness and adaptability.
- **Parameter sensitivity:** Adjust the model's parameters and monitor the strategy's performance. Parameters that greatly affect outcomes may indicate underlying concerns.
- **Scale of return graphs:** Scale on total return graphs can be deceiving. Be wary of how scales on total return graphs can distort perceptions. For instance, a 30% market dip shown on a graph might look more severe in recent periods than in the past due to scaling.
- **Error types:** Differentiate between systematic errors, which are consistent and repeatable, and random errors, which occur sporadically and are less predictable. Understanding the nature of the errors that appear in backtesting provides insights into whether a strategy is genuinely robust or if its success is possibly overstated due to systemic inaccuracies. Systematic errors, if unaddressed, may lead to consistently poor performance when the strategy is applied in real-world conditions (out-of-sample). Meanwhile, managing and accounting for random errors helps in setting realistic expectations about the performance variability and aids in developing risk management strategies that can handle unexpected market changes.
- **Benchmark comparison:** Compare the strategy's performance against relevant benchmarks. This helps to contextualise the backtest results by showing how the strategy performs relative to relevant broad markets or specialised indices. This comparison is crucial even for absolute return strategies that aim to generate positive outcomes regardless of market conditions. By measuring performance against benchmarks, investors can gauge the added value of the strategy over traditional market investments, understand the strategy's risk-adjusted returns, and assess its capability to achieve alpha.
- **Performance measures:** Choose performance metrics that align with the objectives of the strategy. While the Sharpe ratio is commonly used to evaluate the risk-adjusted return, it is not without flaws. One significant issue with the

Sharpe ratio is that it assumes return distributions are normal, which often is not the case in financial markets where extreme values can skew the results. Additionally, this metric does not differentiate between upside and downside volatility, treating all volatility as equal, which might not be appropriate for strategies that aim to capitalize on high-volatility environments. Consequently, it is important to complement the Sharpe ratio with other metrics, such as the Sortino ratio or Maximum Drawdown (MDD), which focus on downside risk, providing a more nuanced view of performance relative to draw-down risks.

- **Friction Costs:** Evaluate the performance after accounting for costs, particularly transaction fees, bid-ask spreads, and slippage.
- **Alignment between backtest result and forward**-testing results: Periodically perform walk-forward test on the strategy and compare actual results with the performance implied by the backtest. When there is severe divergence in the two sets of results, investigate further to determine if difference is due to one-offs that are likely not repeatable or a structural change in the market environment that should be dealt with by the model.

These practices help ensure a more realistic and useful evaluation of a strategy's potential success, grounding investment decisions in reality rather than in optimistically skewed data that may perform poorly out-of-sample.

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