



ACTIVE VS PASSIVE LOW RISK INVESTING

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Overview

The scientific foundations for low volatility investing were laid almost 70 years ago and are well understood, but investors are increasingly focusing their attention on issues of practical implementation. A key concern for investors is how to incorporate ESG and liquidity preferences into low risk portfolios while managing transaction costs optimally.

The occurrence of negative oil prices during the Covid-19 crisis and consequent effects on passive oil ETFs have raised additional questions about passive investment vehicles: managers had to actively intervene to override passive rebalancing rules to mitigate the risk of the vehicle's failure.¹

In this paper, we examine and highlight the strengths of active low risk investing compared to passive low risk investing. We find that passive low risk indices have significantly larger illiquid holdings than active low risk portfolios and we demonstrate the adverse effects of such concentration risk in stress situations. Moreover, an examination of ESG characteristics shows that existing passive indices provide suboptimal carbon and ESG characteristics compared to what active management can offer.

We Therefore Make Six Recommendations to Low Risk Strategy Investors:

1. Given the demonstrably higher illiquidity of passive low risk indices, any future liquidity shocks or outflows are likely to have an adverse effect on passive vehicles compared to active solutions.
2. Low risk portfolios with suboptimal ESG ratings due to the inclusion of stocks with, for example, higher carbon footprints can be poor at protecting on the downside. Conversely, actively-managed, low risk portfolios demonstrate greater resilience and are better at matching investor ESG preferences, according to our analysis.
3. Stringent sector constraints have historically had an adverse effect on the risk-adjusted return of low risk portfolios. Tight sector constraints in passive low risk portfolios are likely to be inferior at limiting downside risk relative to active portfolios in the current environment.
4. Our analysis shows that symmetric factor exposure constraints can be harmful to portfolios. This is because they can allow persistent Value underweights, for example, as well as periodic underweights to Momentum and Quality factors that carry a positive risk premium on average. Controlling factor constraints asymmetrically and avoiding underweights is shown to be a superior approach to risk management.
5. Constant turnover budgets adopted by passive providers are suboptimal from the perspective of both volatility reduction and managing transaction costs. As the opportunity set in terms of volatility reduction and the costs of implementation varies through time, it is important that the level of turnover varies. By varying the level of turnover to reflect both long-term assumptions about the size of the low volatility premium and short-term dynamics of the market environment, active managers are better able to balance portfolio implementation costs with expected returns.
6. Our recommendations are forward looking and based on several analytical frameworks described in this document. It may not have been beneficial to follow some of the recommendations over the last few years, such as avoiding underweight exposures to value, but we believe that the recommendations we make remain very beneficial for the forward-looking, risk-adjusted return profile of a low risk strategy.

Practical Concerns of Implementing Low Risk Strategies

The scientific foundations of low risk investing date back to Markowitz (1952) and subsequent studies shed light on the sources of its attractive risk-return relationship (Black (1972), Haugen and Heins (1975), Baker, Bradley and Wurgler (2011), Frazzini and Pedersen (2014)). More recent studies link the return profile of low risk strategies to investors' preference for skewness (Schneider, Wagner and Zechner (2020)) and confirmed its prevalence across asset classes (Alquist, Frazzini, Ilmanen and Pedersen (2020)).

Several papers (Chow et al (2014)) have compared different portfolio construction methods (such as heuristic risk measure weighting, PCA or shrinkage methods) and found relatively similar risk-return profiles. However, relatively few studies examine practical implementation questions such as how to benchmark active low risk strategies (Blitz and van Vliet (2011)) and the choice of active versus passive investment vehicles to access low risk strategies.

¹ See 'World's largest oil ETF revamps portfolio after market chaos', Financial Times, 21 April 2020.



The launch of passive minimum volatility indices by MSCI in 2008 and subsequent ETF launches (by STOXX, Ossiam, FTSE Russell and others) means that investors are faced with the implementation question of whether to invest in low risk strategies using active or passive approaches. The steady decrease of transaction costs in equity markets has led to careful attention being paid to order execution and turnover. Investor liquidity and ESG preferences are additional practical considerations that have taken center stage following the Global Financial and the Covid-19 crises.

The downside protection properties of low risk strategies have been generally poor during the Covid-19 crisis. Therefore, our analysis is designed to make forward-looking recommendations to low risk investors regarding the likely advantages of active versus passive low risk strategies.

The Importance of Liquidity

The role of liquidity risk and liquidity premia has been studied extensively since the Global Financial Crisis (GFC) and the majority of investors would prefer higher liquidity for a given risk-adjusted return. Surprisingly, academics and practitioners have paid little attention to the wide disparities between active and passive low risk portfolios in terms of their liquidity and impact on downside protection.

The importance of liquidity in passive and active portfolios can be analysed in terms of liquidity differences of holdings as well as the impact on portfolio performance. The MSCI Minimum Volatility indices have a much higher illiquidity tolerance than many active low risk portfolios despite the fact that the passive index has a significantly higher level of assets tracking the index. It is plausible that stocks with a high level of 'index liquidity intensity' – i.e., the liquidity demand for a marginal dollar of a MSCI Minimum Volatility index investment is high – are ripe for distortion.

The recent crisis provides some observations to test this intuition, although outflows experienced by ETFs were moderate in scale compared to other historical periods. The fact that recent outflows from low volatility ETFs during the Covid-19 crisis have been muted does not exclude the possibility that outflows in the future could be significant and reminiscent of the so-called August 2007 quant crisis (Khandani and Lo (2011)). Our analysis suggests that large, concentrated, illiquid positions can negatively affect portfolio performance in times of crisis and actively-managed, low risk portfolios mitigate this risk successfully. Very highly concentrated stocks exhibited underperformance relative to the low risk universe when accounting for the performance of their local cohort.

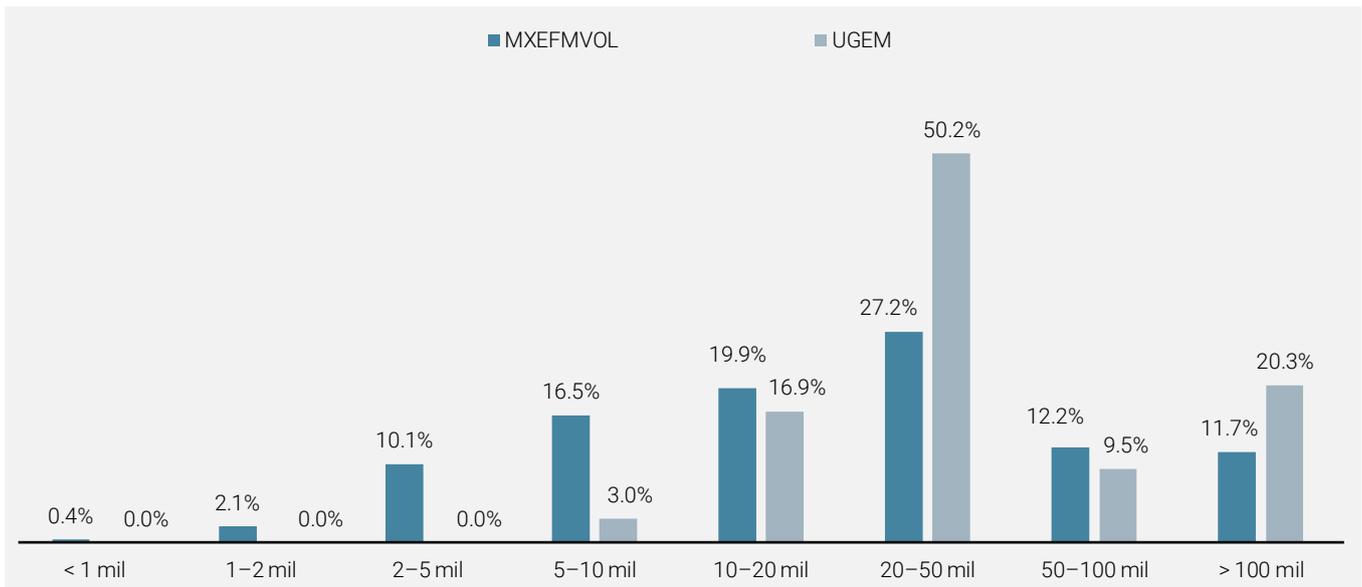
Differences in Liquidity Between Active and Passive Low Risk Portfolios

Figure 1 below illustrates the relative illiquidity of the passive ETF index constituents for the emerging markets universe. The figure shows two different measures of liquidity, namely average daily volume (ADV) and 'time to sell USD 1 billion'. ADV is a stock-specific measure of trading volume averaged over the last year (Panel A of Figure 1) measured in the amount traded in USD, while the time to sell USD 1 billion is based on the average daily trading volume by stock and the holdings of a given stock in the index assuming a 20% participation rate in ADV (Panel B of Figure 1). It is clear from Panel A that passive ETF investors are much more exposed to illiquid stocks (defined as stocks with ADV below USD 5 million). The iShares ETF (EEMV) that is designed to fully replicate the MSCI Emerging Markets Minimum Volatility index has more than USD 4 billion of AUM.

Panel B of Figure 1 shows that this implies that around 10% of holdings in the EEMV portfolio would take more than 30 trading days to sell (positions with more than seven days to sell for USD 1 billion of assets and USD 4.2 billion of AUM). This poses problems not only for potential future outflows from the ETF but also for regular rebalancings. If an illiquid position is to be sold off quickly due to ETF rebalancing, the price impact on both the ETF and the underlying illiquid position could be significant. An example of such ETF rebalancing has been recently observed in oil tracking ETFs, which saw the prices of the underlying illiquid oil futures dip into negative territory. In crisis times, this is a risk that many investors would be uncomfortable to bear if the risk was made as explicit as in the analysis in Figure 1. Active management of low risk strategies such as in the Unigestion Emerging Markets portfolio (UGEM) successfully reduces this risk.

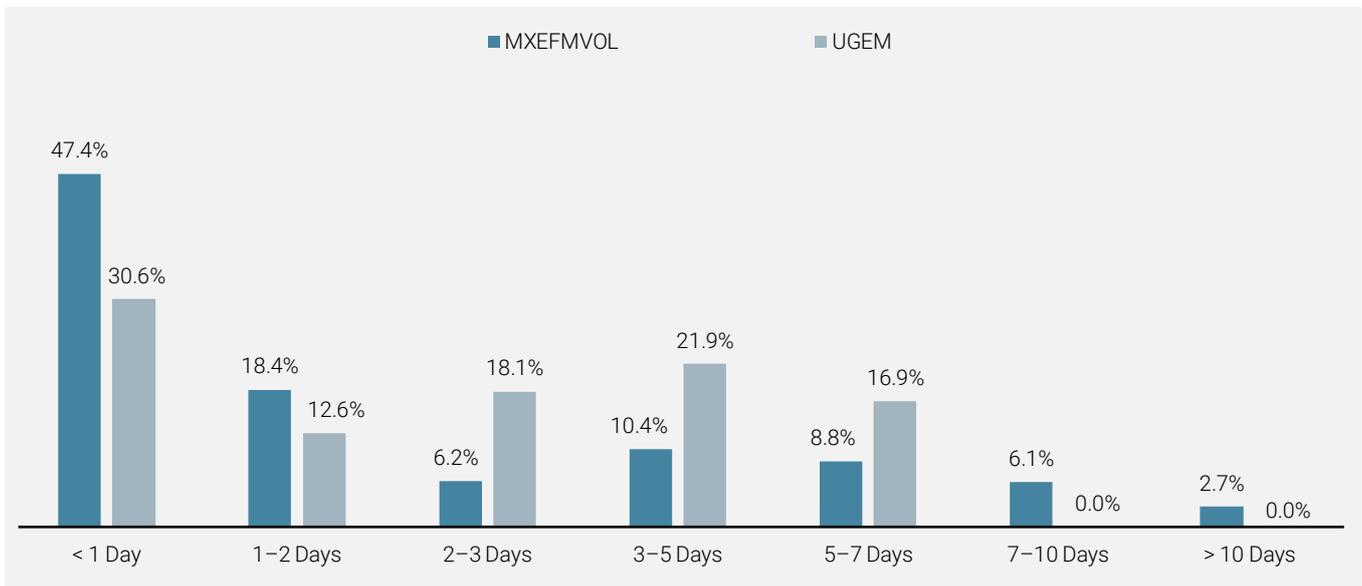


Figure 1 (Panel A): Percentage of Holdings by Average Daily Volume (ADV) (USD millions)



Source: MSCI, S&P Compustat, Unigestion, June 2020

Figure 1 (Panel B): Time to Sell USD 1 Billion



Source: MSCI, S&P Compustat, Unigestion, June 2020.

The Impact of Liquidity on Performance

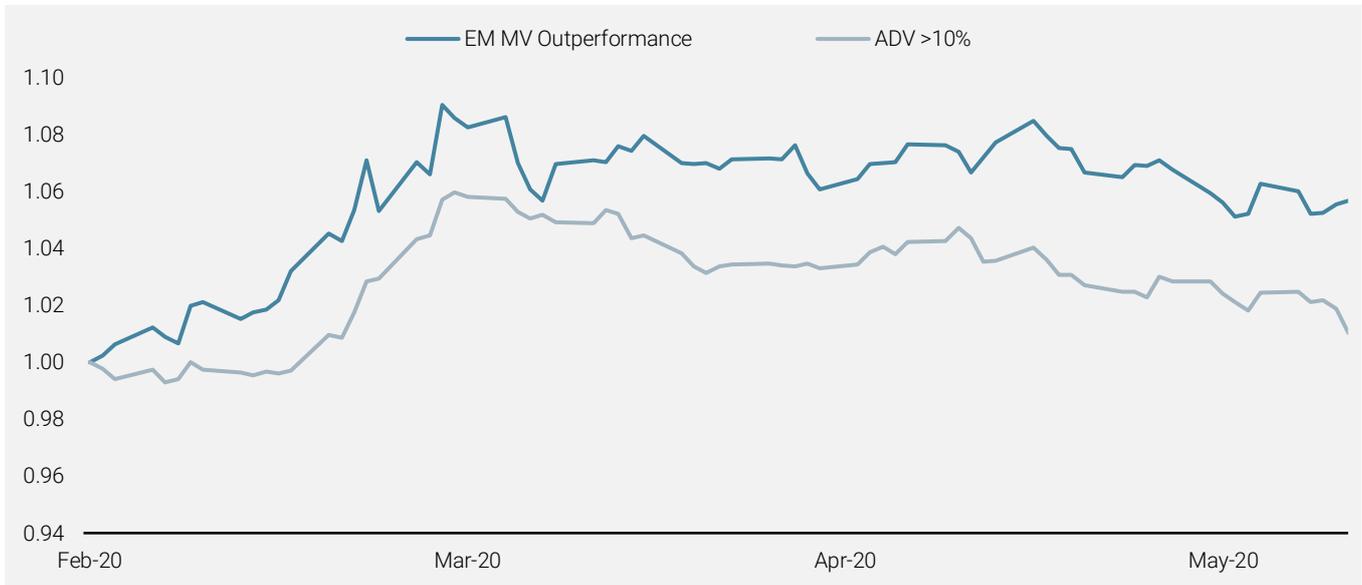
Panel A of Figure 1 shows clearly that investors in passive low risk ETFs take on increased liquidity risk. How does this risk manifest itself? In theory, the higher liquidity risk exposure should lead to underperformance when there is a crisis and associated liquidity shock. In Figure 2 below we use the recent Covid-19 crisis to illustrate the effect of illiquidity on stock performance. We examine the performance of illiquid constituent stocks relative to the MSCI Emerging Markets index. Stocks in the index are equally weighted and their performance is expressed relative to their country index.

We assess the liquidity risk and concentration as follows. We assume an outflow event of USD 100 million for the MSCI Emerging Markets Minimum Volatility universe. We then use the MSCI Minimum Volatility portfolio weights to calculate which stocks would experience a liquidity requirement that would exceed 10% in terms of ADV based on these outflows.



The blue line in Figure 2 shows the outperformance of stocks in the MSCI Emerging Markets Minimum Volatility index relative to the MSCI Emerging Markets index. Low risk stocks provided superior performance during the crisis as expected. However, the level of protection provided decreases with the level of illiquidity. It is clear that very highly concentrated stocks underperformed the MSCI Emerging Markets Minimum Volatility portfolio. This analysis shows that there are significant differences in the liquidity of active and passive low risk portfolios and these differences matter in terms of performance in crisis times.

Figure 2: Liquidity Risk and Performance During Covid-19 Crisis



Source: Computstat, Unigestion. Data: 19 February–29 May 2020.

This chart contains hypothetical performance, please refer to the Important Information at the end of the document. Hypothetical performance is no guide to the future, the value of investments can fall as well as rise, there is no guarantee that your initial investment will be returned. Performance is shown gross of fees, thereby the inclusion of fees, costs and charges will reduce the overall value of performance. Returns may increase or decrease as a result of currency fluctuations.

Investors' ESG Preferences

As we discussed in detail in our white paper *'ESG Integration Within Minimum Variance Portfolios'* (May, 2020)², investors are increasingly integrating ESG preferences into their portfolios. Unigestion has been at the forefront of responsible investing since 2004 and we describe in the white paper how Unigestion integrates ESG into its low risk strategies. Recently, passive low risk portfolio providers have started to incorporate ESG criteria into their portfolios. This raises the question of whether investors can best express their ESG preferences by investing in active or passive low risk portfolios.

One provider of passive low risk indices with ESG criteria is MSCI, which offers a MSCI World Minimum Volatility ESG Reduced Carbon Target index. Given the importance of environmental and climate change concerns for many investors, we first compare the carbon footprint of this passive index to the carbon footprint of the Unigestion global portfolio. We measure the carbon footprint using scope 1, 2 and 3 emissions.³

It is clear from Figure 3 that off-the-shelf, rule-based low risk strategies such as the MSCI World Minimum Volatility index that do not pay any attention to ESG considerations have a high and unacceptably large carbon footprint. The reason for this high level is the fact that historically, many low risk companies were in the energy utility sector, which is very carbon intensive, as Panel C of Figure 3 illustrates.

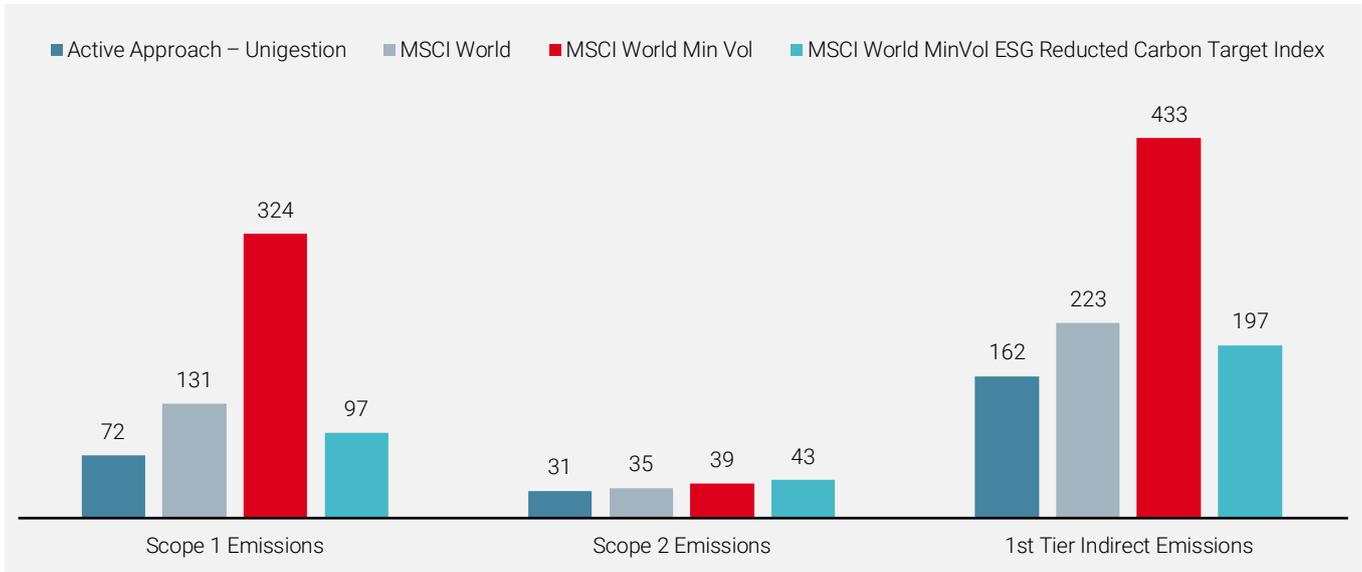
² <https://www.unigestion.com/insight/esg-integration-within-minimum-variance-portfolios/>

³ The GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'scopes'. Scope 1 emissions are defined as direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Direct emissions are the greenhouse gases emitted by the reporting entity (equivalent to the Greenhouse Gas Protocol's scope 1 emissions). First-tier indirect emissions are the greenhouse gases emitted by an entity's first-tier suppliers. This will include scope 2 and some upstream scope 3 emissions.



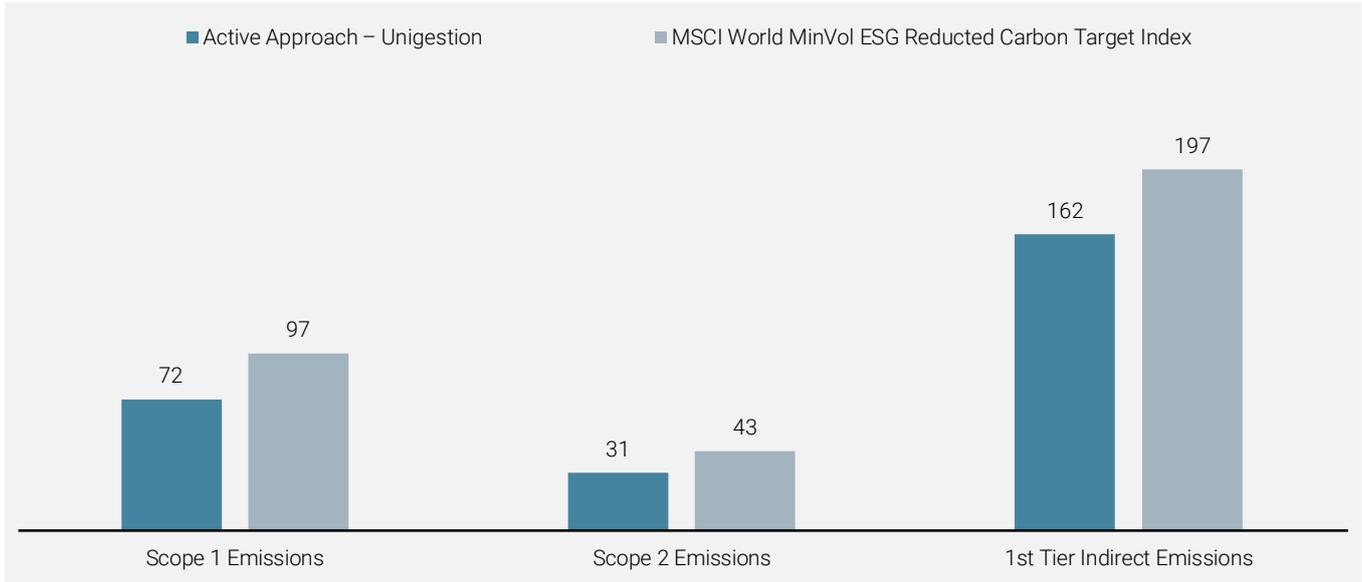
The second insight is that the MSCI World Minimum Volatility ESG Reduced Carbon Target index achieves a carbon footprint reduction but it is not as significant as the active approach. The third insight is that the active Unigestion low risk portfolios have significantly lower scope 1, 2 and 3 emissions. As Panel A of Figure 3 shows, the Unigestion portfolio has a 10-20% lower carbon emissions level depending on whether scope 1, 2 or 3 emissions are considered.

Figure 3 (Panel A): Carbon Footprint of Active and Passive Low Volatility Strategies



Source: Bloomberg, MSCI, iShares, S&P Trucost, and Unigestion, March 2020.

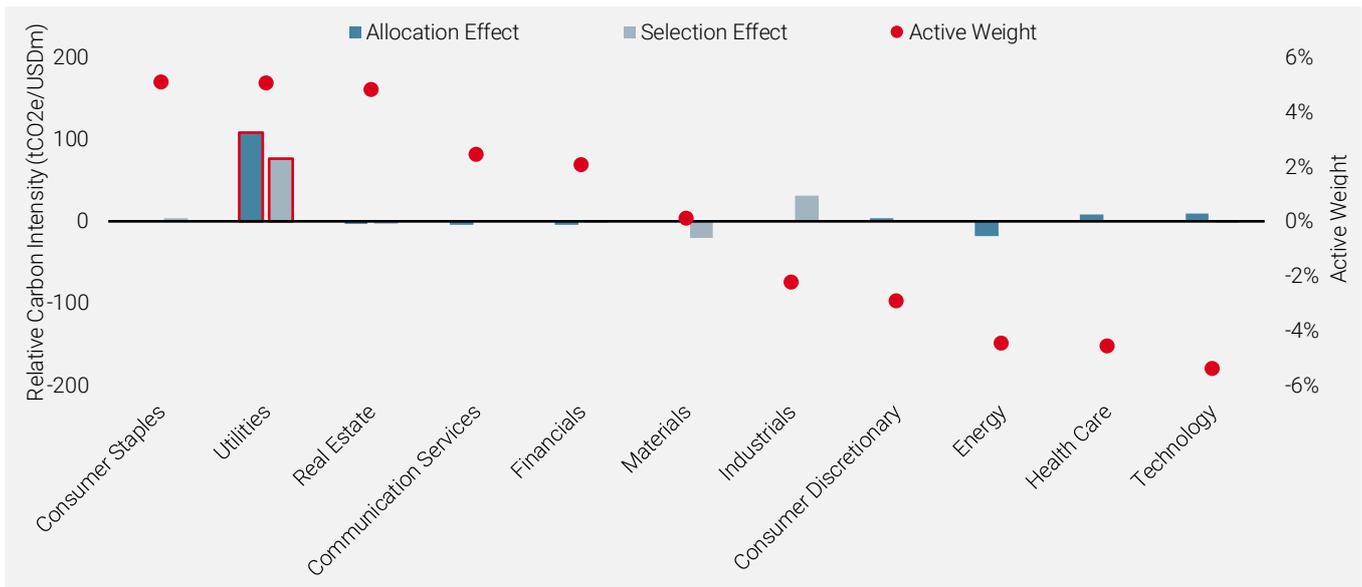
Figure 3 (Panel B): Carbon Reduction in Active and Passive Carbon-optimised Portfolios



Source: Bloomberg, MSCI, iShares, S&P Trucost, and Unigestion, March 2020.



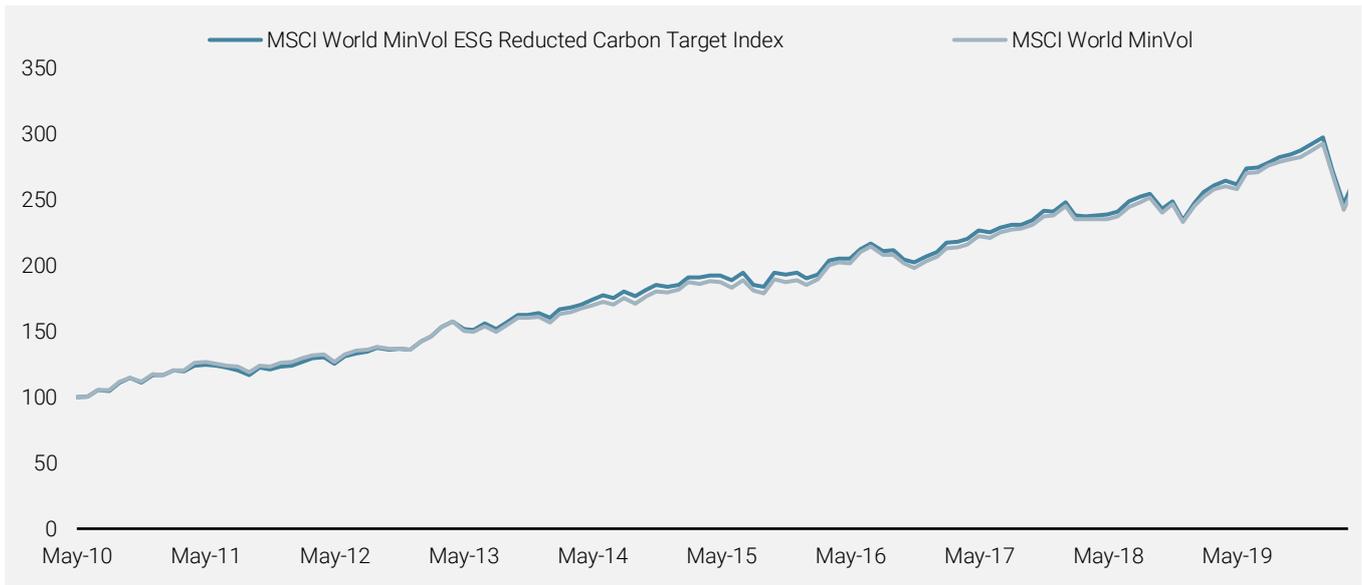
Figure 3 (Panel C): Carbon Footprint Decomposition of MSCI World Minimum Volatility vs MSCI World Indices



Source: MSCI, S&P Trucost, and Unigestion. December 2019.

In addition to environmental concerns, investors care about governance and social aspects of their investments. Therefore, Unigestion has incorporated ESG criteria beyond purely environmental considerations. In terms of performance, we compare the cumulative performance difference between the MSCI World Minimum Volatility and the MSCI World Minimum Volatility ESG Reduced Carbon Target indices in Figure 4. It is apparent from the figure that the two indices are almost indistinguishable in terms of their performance and risk.

Figure 4: Cumulative Performance of the MSCI Minimum Volatility vs. MSCI World MinVol ESG Reduced Carbon Target Index

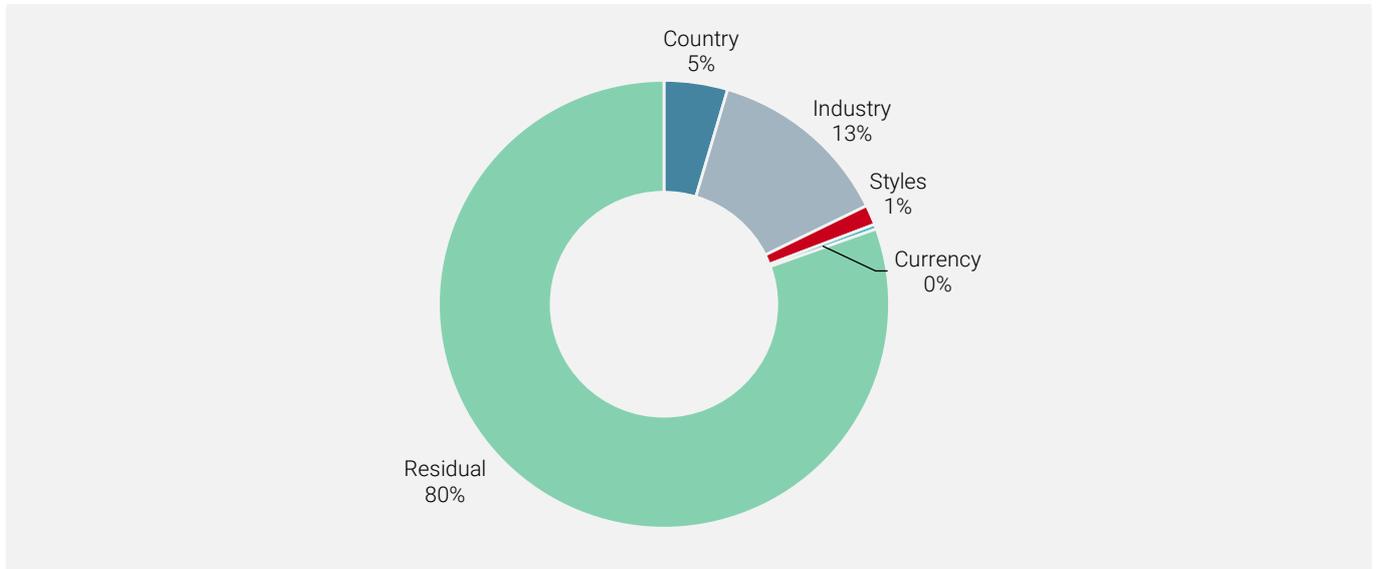


Source: MSCI. Performance shown from 1 May, 2010 to 30 April, 2020.



Although the two indices have similar portfolio risk profiles⁴ (i.e. 26.1% versus 25.9% for MSCI World Minimum Volatility ESG Reduced Carbon Target Index⁵ and MSCI Minimum Volatility index, respectively, as of 30 April 2020), the composition of risk could be different. The active risk between the two indices is 1.2% and a large portion of the active risk is from the residual components, as Figure 5 illustrates.

Figure 5: Risk Decomposition



Source: Bloomberg, April 2020.

While Unigestion's ESG approach is forward looking and historical performance data is of limited use for the assessment of the future potential of ESG optimised portfolios, investors should study carefully the risk and fundamental profile of the portfolio composition, and ultimately, reasons why the two time series in Figure 4 are so similar from a value-added perspective.

In contrast to the ESG-optimised passive portfolios, the Unigestion white paper "*ESG Integration Within Minimum Variance Portfolios*" (May 2020) shows that the Unigestion ESG approach leads to higher risk-adjusted returns over different sample periods. Overall, we observe that active and passive low risk portfolios show some material differences in their liquidity and ESG risk exposures. Active low risk portfolios exhibit lower liquidity risk as well as a lower carbon footprint and better ESG standards at the individual stock level.

Sector Constraints

MSCI is one of the most well-known, passive, low risk index providers and the MSCI World Minimum Volatility index construction features a $\pm 5\%$ sector constraint and a ± 0.25 Z-score style constraint relative to the parent index. These sector margins are a significant constraint on the portfolio and below we study what effect the constraint has had on performance and risk over the last 15 years since May 2005.

To study the effect of sector and style constraints, holding other elements constant, we create a simple MSCI passive ETF replicator. We attempt to approximate the MSCI methodology since we do not have access to their risk model, and we use different factor exposure definitions. We believe that this is a minor concern, however, since it is the relationship between the level of the constraints and portfolio risk and performance that we are focusing on.

⁴ For fairness, we use a third party risk model from Bloomberg PORT, that is its Global Fundamental Risk model, as of 30 April 2020.

⁵ We do not have information on the holdings of this index, but we use the iShares MSCI MinVol ESG UCITS ETF, which tracks the same index, as a proxy.



Table 1 compares different portfolios. The first row shows the MSCI All Country (AC) World TR (Total Return) index, the second line, the MSCI AC World Minimum Volatility TR and the last six rows show the summary statistics of the replication portfolio for different levels of the sector constraint. It is clear from the analysis that imposing no sector constraints would have reduced portfolio volatility, increased the Sharpe ratio and improved the portfolio asymmetry. Backtests such as the one below are of course not representative of future performance but, in terms of the gross return performance, the 5% constraint level chosen by MSCI seems to be suboptimal since the table shows a U-shaped pattern in terms of portfolio performance and the level of the sector constraint.

Table 1: The Impact of Sector Constraints on Portfolio Performance

	Vol	Return Gross	Sharpe	Bull Partc	Bear Partc	Asym
MSCI AC World Daily TR Net USD	16.79%	6.25%	0.372			
MSCI AC World Minimum Volatility Index Net USD	11.68%	7.81%	0.668	61.0%	65.3%	4.3%
+/- 1% GICS1	12.41%	8.05%	0.649	67.6%	71.7%	4.1%
+/- 3% GICS1	12.10%	7.95%	0.657	65.4%	69.5%	4.1%
+/- 5% GICS1 (MSCI MinVol Setting)	11.89%	7.88%	0.663	63.6%	67.8%	4.2%
+/- 7% GICS1	11.70%	7.98%	0.682	62.1%	66.5%	4.4%
+/- 10% GICS1	11.45%	7.95%	0.695	59.8%	64.3%	4.5%
No GICS1 Constr	11.34%	8.08%	0.713	58.0%	62.8%	4.8%

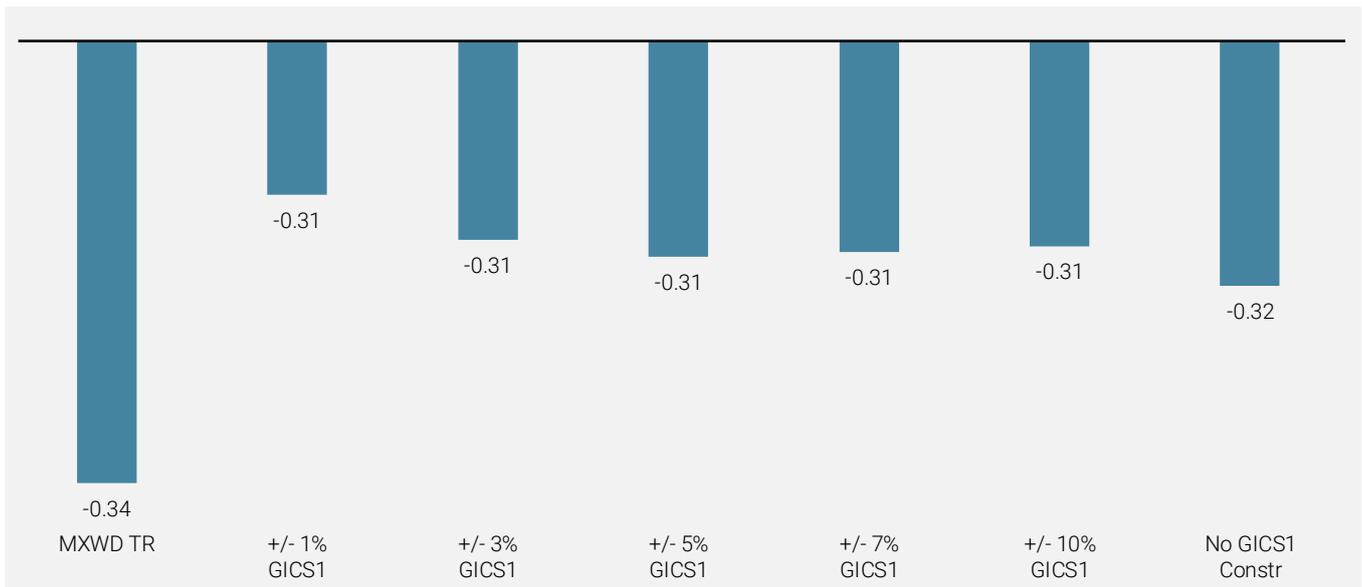
Sources: MSCI, S&P Compustat, Unigestion. Backtested performance from May 2005 to May 2020. This chart contains hypothetical performance, please refer to the Important Information at the end of the document. Hypothetical performance is no guide to the future, the value of investments can fall as well as rise, there is no guarantee that your initial investment will be returned. Performance is shown gross of fees, thereby the inclusion of fees, costs and charges will reduce the overall value of performance. Returns may increase or decrease as a result of currency fluctuations.

A more detailed analysis reveals that sector constraints should not be applied unconditionally since they do not always add value in terms of risk-adjusted performance. For example, in 2008 during the GFC, a tight 5% constraint level would have led to an underperformance of nearly 2% compared to a 10% constraint level. Even during the recent COVID-19-related drawdown, when low volatility sectors did not provide the same level of downside protection as they have in the past, using a 5% sector constraint would not have been optimal.

Figure 6 compares the maximum drawdowns of the capitalisation-weighted benchmark with our passive strategy replicators and different GICS1 constraint levels over the time period from 14 February 2020 to 21 March 2020. The figure shows that the maximum drawdowns of the no-constraint replicator ('No GICS1 Constr.') lies within less than 50 basis points of that of the constrained versions with constraints ranging from 3% to 10%. The differences are economically insignificant. Only an unreasonably tight 1% sector constraint added some economic value by assigning more weight to the well-performing IT sector, but it still only leads to a drawdown reduction of a little more than 1%.



Figure 6: The Impact of Sector Constraints on Maximum Drawdown during the Covid-19 Crisis



Sources: MSCI, S&P Compustat, Unigestion. Data: 14 February - 21 March 2020.

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Factor Constraints

Passive indices such as the MSCI Minimum Volatility indices use factor or so-called style constraints. The MSCI style constraints are set at +/- 0.25 standard deviations of factor scores relative to the Barra factor exposure of the MSCI AC World parent index. To study the impact of these style constraints in our passive index replication analysis, we do not use Barra factors but our internal Momentum, Value and Quality factor exposures.

While, as we saw in Section 4, sector constraints in passive low risk strategies appear to be too tight to fully exploit the Low Volatility anomaly, our analysis shows that factor constraint levels are typically selected in such a way that they are rarely binding. This might be an appropriate choice from the passive implementation perspective – the symmetric factor constraints act more like safety nets to ensure that there are no significant risk contributions from styles other than Low Volatility. At the same time, some style factors are known sources of alpha and running a negative exposure to them would eventually negatively affect a strategy. A prime example of this is the Value factor and the strategy's exposure to it.

MSCI Minimum Volatility strategies typically show a negative Value exposure with respect to capitalisation-weighted indices. Adding a constraint of no underweight to Value shows a long-term outperformance compared to a simple, safety-net symmetric constraint in Table 2. The row 'No Val Underweight' shows a marginal improvement in the Sharpe ratio and an improvement in the measure of portfolio asymmetry from 4.16% to 4.23%. One caveat is that these results are based on Value constraints using Unigestion's definition of Value, which has not suffered from dramatic underperformance in the low risk space.

MSCI Minimum Volatility strategies periodically have negative exposure to Momentum and Quality factors. Stipulating a no-underweight to Momentum predictably improves performance as the table below shows. While stand-alone constraints of a no-Quality underweight did not help in the long term, applying all three factor constraints together leads to further improved performance with the Sharpe ratio rising to 0.667 and the asymmetry measure rising to 4.27%.



Table 2: The Impact of Factor Constraints on Portfolio Performance

	Vol	Return Gross	Sharpe	Bull Partc	Bear Partc	Asym
MSCI AC World Daily TR Net USD	16.79%	6.25%	0.372			
MSCI AC World Minimum Volatility Index Net USD	11.68%	7.81%	0.668	61.0%	65.3%	4.27%
No Factor Constraints	11.89%	7.88%	0.663	63.6%	67.8%	4.16%
+/- 0.25 Z-score on Val, Mom and Qty	11.90%	7.81%	0.663	62.4%	66.6%	4.17%
No Val Underweight	12.00%	7.98%	0.665	64.2%	68.4%	4.23%
No Mom Underweight	12.00%	7.96%	0.663	64.1%	68.3%	4.22%
No Qty Underweight	11.83%	7.84%	0.663	63.5%	67.6%	4.14%
No Val, Mom, and Qty Underweight	12.06%	8.04%	0.667	64.6%	68.9%	4.27%

Sources: MSCI, S&P Compustat, Unigestion. Backtested performance from May 2005 to May 2020. This chart contains hypothetical performance, please refer to the Important Information at the end of the document. Hypothetical performance is no guide to the future, the value of investments can fall as well as rise, there is no guarantee that your initial investment will be returned. Performance is shown gross of fees, thereby the inclusion of fees, costs and charges will reduce the overall value of performance. Returns may increase or decrease as a result of currency fluctuations.

The conclusion from the above analysis is that factor constraints matter. However, constraints that are symmetric can be dangerous given that they can lead to undesirable underweights to factors such as Value, Momentum and Quality compared to the market capitalisation-weighted benchmark. This is detrimental since an underweight to a factor that carries a risk premium in the long-term leads to a performance loss.

Turnover and Transaction Costs

The steady decrease in transaction costs in equity markets has led to careful attention being paid to order execution and turnover. The MSCI Minimum Volatility index methodology has a turnover constraint in the form of a maximum 10% one-way turnover per rebalancing. The rebalancing is semi-annual and occurs in May and November. One question that arises is whether these passive turnover and rebalancing rules are optimal or whether they could be improved through active turnover management.

Both the market impact and the volatility reduction implied by risk models vary over time: markets can be expensive to trade; stocks vary in their levels of correlation; and high levels of diversification may only be found in expensive-to-trade markets. Even a simple assumption regarding the size of the Low Volatility anomaly – the expected raw or risk-adjusted outperformance associated with a reduction in portfolio risk – implies that the level of turnover should vary with the cost of reducing volatility.

We present a simple rule here where the semi-annual turnover is not constrained but is determined by offsetting the benefits of volatility reduction with transaction costs associated with rebalancing in the optimisation. Table 3 documents the advantages of a transaction cost penalty over the fixed turnover budget. It is interesting that the benefits are seen even before accounting for transaction costs.

As the opportunity set in terms of volatility reduction and the costs of implementation varies, it is important that the level of turnover varies. By varying the level of turnover to reflect both long-term assumptions about the size of the Low Volatility premium and short-term dynamics of the market environment, active managers can more effectively balance portfolio implementation costs with volatility reduction. By contrast, static turnover rules expose the end investor to over-trading when the opportunity set is poor, net of costs, and under-trading when it is rich. An active manager is well positioned to go even further and implement trigger-based rebalancing rules, which will lead to portfolio rebalancing, not on fixed calendar dates but when it is most beneficial to do so.



Table 3: Advantages of Transaction Cost Penalty Over the Fixed Turnover Budget

	Vol	Return Gross	Sharpe	Return Net	Sharpe Net	Bull Partc	Bear Partc	Asym	Annual Turnover
	16.79%	6.25%	0.372						
MSCI AC World Daily TR Net USD	11.68%	7.81%	0.668			61.0%	65.3%	4.27%	
MSCI AC World Minimum Volatility Index Net USD	11.89%	7.88%	0.663	7.56%	0.636	63.6%	67.8%	4.16%	20%
10% Turnover Budget	11.82%	8.00%	0.677	7.92%	0.669	63.0%	67.3%	4.34%	18.50%

Sources: MSCI, S&P Compustat, Unigestion. Backtested performance from May 2005 to May 2020. This chart contains hypothetical performance, please refer to the Important Information at the end of the document. Hypothetical performance is no guide to the future, the value of investments can fall as well as rise, there is no guarantee that your initial investment will be returned. Performance is shown gross of fees, thereby the inclusion of fees, costs and charges will reduce the overall value of performance. Returns may increase or decrease as a result of currency fluctuations.

Future Performance and Conclusions

Historical performance is not a good guide to future performance, but based on the above analysis we can venture an outlook into the future, based on the above analytical frameworks.

First, regarding the documented higher illiquidity of passive low risk indices, it is fair to say that any future liquidity shocks or outflows are likely to have an adverse effect of passive vehicles compared to active solutions. Potential scenarios that could create such liquidity shocks include deteriorating market sentiment associated with recurring recession fears or geopolitical tensions.

Second, the ESG characteristics of low risk portfolios may have a significant impact on future returns. The historical performance of portfolios with certain ESG characteristics is an imperfect guide to the future, but as regulation and technology changes, stocks with superior ESG features may perform better than stocks with suboptimal ESG ratings. Our analysis shows that low risk portfolios that are actively managed, show better resilience and ESG characteristics, since they prevent stocks with, for example, higher carbon footprints from entering the portfolio and exposing it to downside risk.

Third, we saw that stringent sector constraints historically have had an adverse effect on the risk-adjusted return of low risk portfolios. Looking forward, the current sector constraints of passive indices such as MSCI would mean that a rebound in markets would likely generate better performance, but a continued downturn would mean that active, low risk approaches would perform relatively better.

Fourth, we think that persistent Value underweights as well as periodic underweights of Momentum and Quality are not ideal for low volatility strategies. While the Value risk premium often takes a long time to result in positive performance, it has produced significant returns over longer periods. Value and Momentum exposures are prime candidates for dynamic management in low volatility strategies as they are known to exhibit predictive performance patterns. Such dynamic management of risk premia exposure cannot be accomplished in a passive investment strategy.

Fifth, we show that a fixed turnover budget is suboptimal from the perspectives of both transaction costs and volatility reduction. Flexible rebalancing schedules that take into account transaction costs and volatility reduction can further improve performance for active managers.



References

- Alquist, Ron and Frazzini, Andrea and Ilmanen, Antti S. and Pedersen, Lasse Heje, Fact and Fiction about Low-Risk Investing (February 17, 2020). NYU Stern School of Business. Available at SSRN: <https://ssrn.com/abstract=3539452> or <http://dx.doi.org/10.2139/ssrn.3539452>
- Baker, M., Bradley, B., Wurgler, J., 2011. Benchmarks as limits to arbitrage: Understanding the low-volatility anomaly. *Financial Analysts Journal* 67, 40{54.
- Black, F., "Capital Market Equilibrium with Restricted Borrowing." *Journal of Business*, Vol.45, No.3 (July 1972), pp.444-455.
- Blitz, D.C., and van Vliet P. (2007) The Volatility Effect, *Journal of Portfolio Management* 34, 102-113.
- Chow, T.-M., Hsu, J. C., Kuo, Li-Lan and F. Li, 2014, A Study of Low-Volatility Portfolio Construction Methods, *The Journal of Portfolio Management* 40, 4.
- Coqueret, G., and T. Guida (2018) Stock returns and the cross section of characteristics: A tree-based approach. Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3169773.
- Frazzini, A., and L. H. Pedersen (2014) Betting against beta, *Journal of Financial Economics* 111, 1-25.
- Haugen, R.A., and A.J. Heins. "Risk and the Rate of Return of Financial Assets: Some Old Wine in Bottles." *Journal of Financial and Quantitative Analysis*, Vol. 10, No.5 (December 1975), pp. 775. 784.
- Khandani, Amir E., and Andrew W. Lo (2011), What Happened to the Quants in August 2007? Evidence from Factors and Transactions Data, *Journal of Financial Markets* 14 (1), 1–46.
- Schneider, P. G. and Wagner, C. and Zechner, J., 2020, Low Risk Anomalies? Forthcoming *Journal of Finance*; Available at SSRN: <https://ssrn.com/abstract=2858933>
- Razmpa, S. and Kosowski, R., 2020, ESG Integration Within Minimum Variance Portfolios. Available at: <https://www.unigestion.com/insight/esg-integration-within-minimum-variance-portfolios/>



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