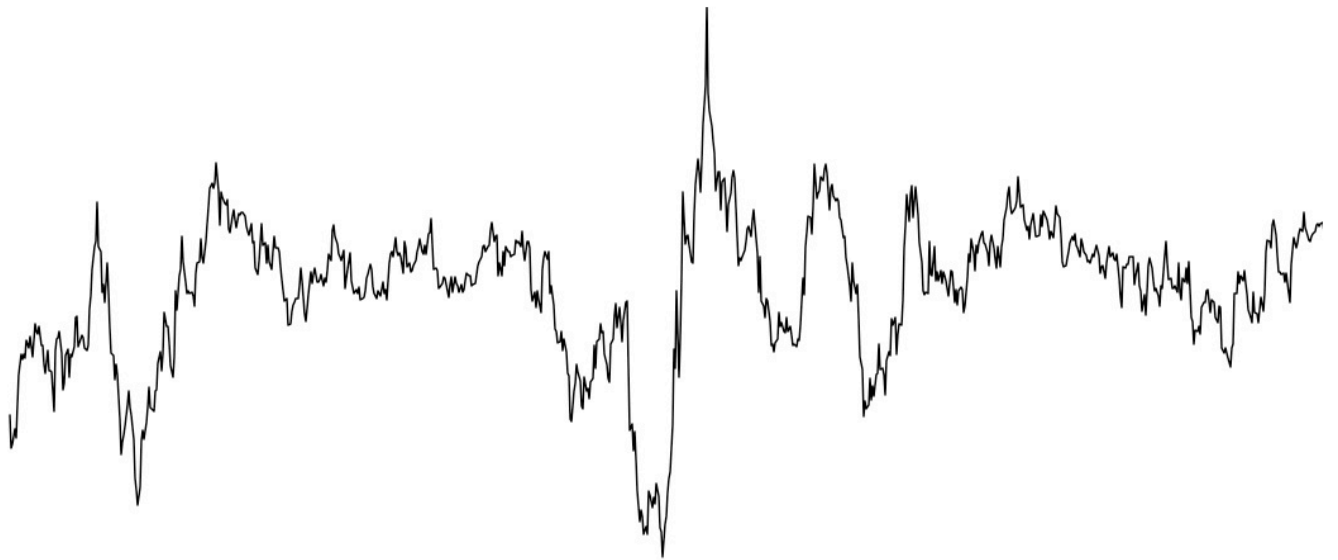# ALPHA SOURCES

SEPTEMBER 21, 2020

THE CASE FOR VALUE STOCKS

It's been a while since I updated these pages, mainly because I have recently moved across the country, back to the Big Smoke, where I am now nestling in the hopefully up-and-coming part of southern London. I will be up and running with my market updates and videos soon enough, but first things first. I have been sitting on this piece, mentally more than anything, for a while, and I thought it would be a nice way to re-start my posting. I have long been thinking about whether it is possible to provide a good quantitative argument in favor of the defunct value equities, or more specifically the value "factor". I think it is, but as always, I leave to you to judge.

In my last post before my temporary hiatus, I made the argument that the vast majority of investors are structurally short volatility. Accepting this premise raises the obvious question; how does one achieve a cheap and effective long vol position? In this post I will try to offer a concrete and quantitative perspective on this question using the simplest tools available to us from finance theory. Before I get to that, though, I want to state the problem more precisely.

In a nutshell, the traditional 60/40 portfolio is doing too well. The increasingly concentrated leadership in equity beta centered around the ubiquitous growth factor—essentially U.S. technology firms—and the correlation of this position to the performance of government bonds—driven by structurally falling interest rates—has been a boon for investors. A 60/40 portfolio with a concentration in growth stocks has increased by a factor of almost 4 since 2010, beating the

MSCI World by almost 25%, not to mention breezing past the main regional indices—MSCI EM and MSCI Europe—by a factor of 2-to-2.5.

That's great news, but it also puts investors in a bind. If a balanced portfolio is winning on both legs what happens when the tide turns? More specifically, if low volatility is characterized by sustained and strong performance in both equities and bonds, does that mean that an increase in volatility reverses this trend, and if so, what can investors do to protect their portfolios from such an event?
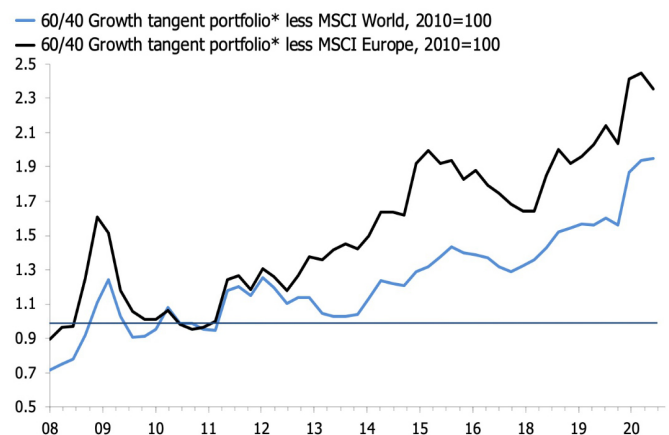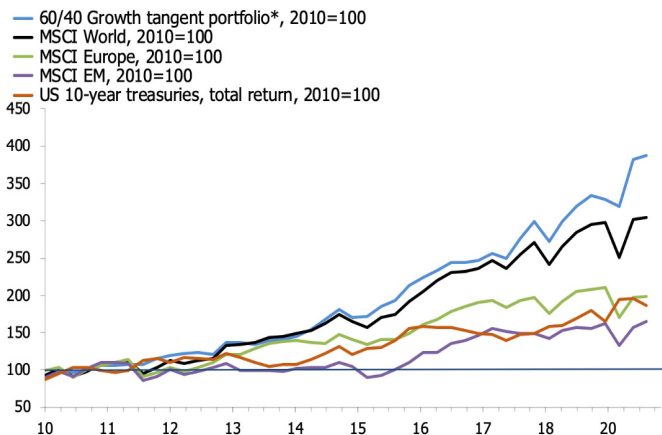
These questions are subject to dizzying amounts of analysis and commentary with conclusions ranging from "keep calm and carry on" to the now-infamous perma-bearish siren song that a gut-wrenching collapse in asset classes of all stripes is just around the corner. It is not my intention to pick a side in this argument. Instead, I will try to conduct a simple exercise in quantitative portfolio allocation to show why the 60/40 portfolio is still the default winner, and how one might go about constructing a portfolio that retains its winning characteristics while at the same time potentially adding an indirect long vol exposure. This is to say, a direct long vol position either requires a specific options/futures-based strategy on volatility itself—which will have a given cost of carry—or holding cash in excess of "normal" seeing that

cash, in effect, is a call option on volatility. An indirect long vol strategy is one which stays in the game, but tries to construct a barbell using generic asset classes.

ALL HAIL THE MIGHTY 60/40 PORTFOLIO

For my experiment I will use the oldest tools in the finance textbook, the tangent and minimum variance portfolios. The first denotes the portfolio on the efficient frontier, and the second is its less known, though no less powerful, sibling; the portfolio which minimizes the variance. Specifically, the former choses weights by maximizing the Sharpe ratio and the latter chooses them by minimizing the variance, both variables determined by their historical values. I won't go into the gory theory here, but I have set up a simple spreadsheet with hard-coded returns— see here—that goes through the motions. You need to be familiar with Excel's Solver to replicate my results, and if you are you should have no issues generating my results, and perhaps even discovering some of your own. Put simply, the tangent portfolio is found by asking the solver to maximize the expected return—a form of Sharpe ratio—by choosing non-zero weights summed to 1. I don't allow shorting or leverage. The min variance portfolio minimizes the variance subject to the same constraints. One addition that I

fig. 01 / Spot the winner; it's easy - **fig. 02** / Only one winner since the GFC

Legend (fig. 01):
— 60/40 Growth tangent portfolio*, 2010=100
— MSCI World, 2010=100
— MSCI Europe, 2010=100
— MSCI EM, 2010=100
— US 10-year treasuries, total return, 2010=100

Legend (fig. 02):
— 60/40 Growth tangent portfolio* less MSCI World, 2010=100
— 60/40 Growth tangent portfolio* less MSCI Europe, 2010=100

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found useful for the tangent portfolio was to cap the standard deviation —at 10%—to provide a clearer counterpoint to the min variance results.
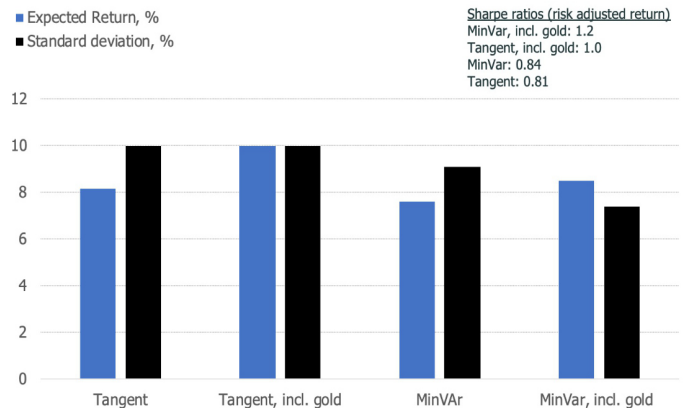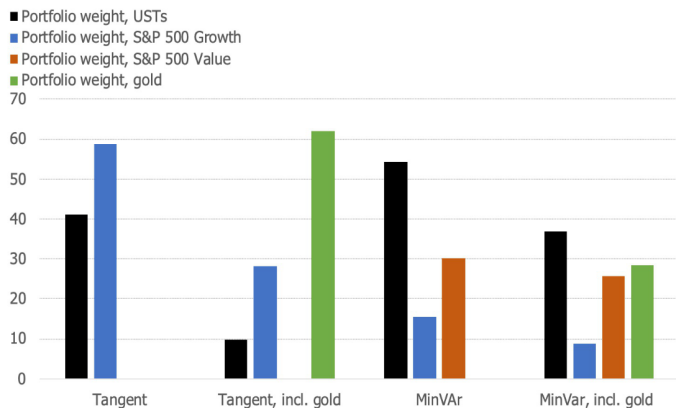
My sample is chosen for the occasion. I am using quarterly returns in GBP from Q1 2001 to Q3 2020—on a year-over-year basis—of the U.S. 10-year, gold, S&P 500 value and S&P 500 growth. The Choice of frequency is key. You *will* get significantly different results if you use daily, weekly or monthly observations not to mention if you use a different return variable, for example six-month or three-month returns. The ghost in the machine here is that the return-frequency chosen is linked to rebalancing—which has a natural trade-off in transaction costs—and this is where these techniques morph from brute force into art. At the end, I will discuss a simple rebalancing framework at the end, but remember; less almost surely is more, especially for retail investors.

The first step is to see whether this framework can generate a case for why investors would want to commit money to a 60/40 strategy, and why such a portfolio should have an overweight towards the growth factor in its equity allocation. As it turns out, this is astonishingly simple. Constrain yourself to three assets; the U.S. 10-year, S&P 500 growth and S&P 500 value, and limit your standard deviation to 10%.

With these variables, the solver returns an optimal portfolio with 41% in bonds and 59% in stocks, with zero weighting in value. This portfolio has an expected return of 8.2% and a standard deviation at the limit, of 10%, for a risk-adjusted return ratio of 0.55. If you want the textbook version for why value equities are a dead asset class, this is basically it. To the extent that this result is generalized by similar, though more advanced, allocation frameworks, it sends a dire message to value, and by extension, non-U.S. focused investors. **There is really no reason for real money investors to hold anything but U.S. growth stocks.** I have to say that I am surprised by how easy it was to produce this result, but perhaps I shouldn't be. After all, the standard portfolio allocation framework rewards that which work, but that it is now completely ignoring the value factor still is a bit of a shock to me.

The first chart above plots the performance of the 60/40 growth portfolio alongside the main alternatives. It leaves them for dead in all cases. The extraordinary thing about this strategy is the consistent and strong performance of both legs. The performance of growth stocks has been impressive, but look closer, and you will see the U.S. long bond doing as well, if not better, than equity beta in other regions. That's an astonishing result

fig. 03 / Not all roads leads to growth stocks - **fig. 04** / MinVar on top?

Legend:
- Portfolio weight, USTs
- Portfolio weight, S&P 500 Growth
- Portfolio weight, S&P 500 Value
- Portfolio weight, gold

Categories: Tangent, Tangent, incl. gold, MinVAr, MinVar, incl. gold

Legend:
- Expected Return, %
- Standard deviation, %

Sharpe ratios (risk adjusted return)
MinVAr, incl. gold: 1.2
Tangent, incl. gold: 1.0
MinVAr: 0.84
Tangent: 0.81

Categories: Tangent, Tangent, incl. gold, MinVAr, MinVar, incl. gold

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given that it is supposed to be the global "risk-free" rate.

One obvious addition to the optimization framework is to add gold to the mix. In preview, the more I look at the result, the more I think that the idea of gold as a hedge is a red herring. Including gold in the model produces the fairly predictable result that everyone should immediately rush to buy the thing, in size. The optimized portfolio now consists of a whopping 61% allocation to the yellow metal, 28% in growth stocks and a mere 10% in bonds. Gold bugs will be beaming with joy over this result, but notwithstanding the fact that few investors can allocate such a chunk of their assets to gold, it also looks like a trap to me. Effectively, the model substitutes bonds for gold, because the historical return series feeds it with the information that gold really is a levered bet on lower rates. That's not exactly groundbreaking insight, and more importantly, it is not what we want, if we're adding gold as a hedge to rising volatility. In other words, can gold perform in an environment where the traditional growth-oriented 60/40 portfolio is motoring higher and be a hedge against disaster? I have my doubts. The more I look at gold, the more I think that it has been assimilated by the 60/40 portfolio, and I am no longer sure that it will do its job if broad-based volatility returns.

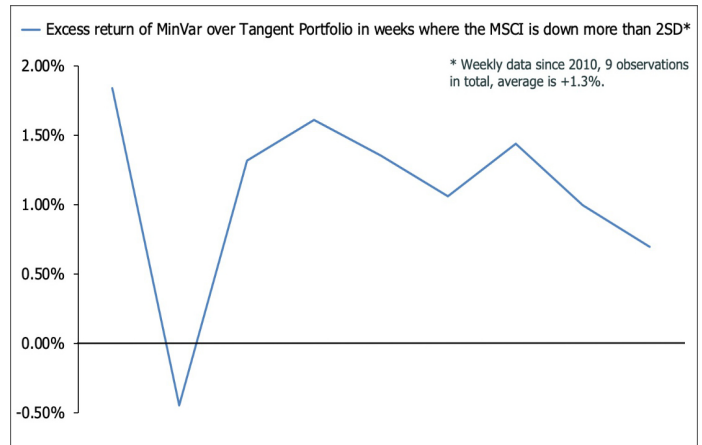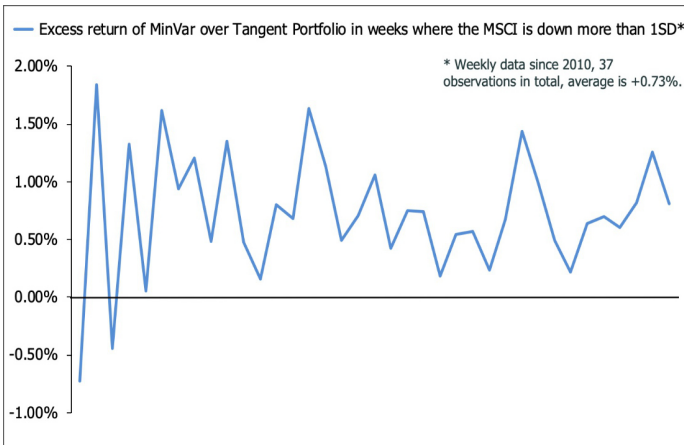## ENTER THE MINVAR PORTFOLIO

The results above are a kiss of death for value investors, but as it turns out, it's fairly easy to turn the tables on the otherwise all powerful 60/40 portfolio. All you need is a bit of common sense, and a slightly different portfolio allocation model. This inquiry is guided by the simple question that if bonds and growth stocks are now indistinguishable, why hold both? **Specifically, if a levered position in bonds can achieve the same return profile as a long position in the Nasdaq, why own growth stocks?** Similarly, if the main threat to a long position in growth and tech stocks is that yields rise—indicating that the very reason why owning bonds in the first place is null and void—should one not try to find an asset class that is inversely correlated to this tandem ride in high-flying tech stocks and duration? Suddenly, the fact that the value factor has been left for dead by the 60/40 portfolio—and even seems to respond well to rising long-term bond yields— becomes an attractive characteristic that investors should want to pay up for. Unless my results are completely off, the MinVar portfolio captures this.

As with the tangent portfolio above, I have run two simulations, one with and without gold. Focusing on the portfolio with the lowest variance now points to an **overweight** in value stocks,

fig. 05 / The MinVar outperforms in drawdowns - **fig. 06** / …even the nasty ones

Excess return of MinVar over Tangent Portfolio in weeks where the MSCI is down more than 1SD*

* Weekly data since 2010, 37 observations in total, average is +0.73%.

Excess return of MinVar over Tangent Portfolio in weeks where the MSCI is down more than 2SD*

* Weekly data since 2010, 9 observations in total, average is +1.3%.

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alongside a virtually unchanged, and sizable, position in bonds. Specifically, the MinVar portfolio is made up of a 30% position in the S&P 500 value index, 16% in the S&P 500 growth index, and 54% in bonds. The inclusion of gold greatly reduces the position in bonds, as with the tangent portfolio, but also dilutes the position in equities. The portfolio now holds 37% in bonds, 38% in gold, 9% in growth equities and 26% in value stocks. As with the tangent portfolio, the addition of gold seems to be a case of a straight substitution for bonds, though note that adding gold also raises the ratio of value to growth stocks, from about 2 to almost 3.
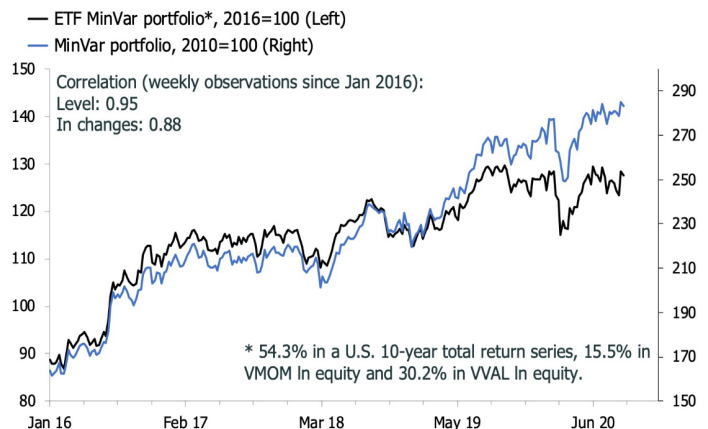
So, what's the benefit from choosing the MinVar portfolio over the 60/40 allocation? On the face of it, not there is not much difference. The non-gold MinVar portfolio has an expected return of 7.6%, with a standard deviation of 9%, for a risk adjusted Sharpe ratio of 0.83. The 60/40 tangent portfolio is expected to deliver 8.2%, with a standard deviation of 10%. Its Sharpe ratio is then 0.81, only trivially less than the MinVar. This comparison, however, downplays the startling result from this simple exercise. Apparently, it's possible to achieve an expected return profile almost equivalent to the 60/40 portfolio by significantly underweighting growth stocks. To the extent that such a portfolio also outperforms during bouts

of volatility, characterized by the 60/40 portfolio losing on both its core positions, it suddenly looks like a much better option. So, does it?

To find out, I conducted three binary studies using weekly returns going back to 2010. As a baseline, I took all the instances when the MSCI World was down on the week, comparing this to the excess return of the MinVar portfolio. This series is noise, and in any case, not flattering for the MinVar portfolio. Out of 332 observations, the median and average return of the MinVar relative to the Tangent portfolio was -0.2% and -0.3%, respectively.

It gets better for the MinVar portfolio, though. In the next two studies, I performed the same analysis relative to a 1 and 2 SD weekly drawdown in the MSCI World, around 2.5% and 5%, respectively. The first study returns 37 observations of which the MinVar outperforms in 35, with a median and average excess return of 0.7%. The study with a 2SD drawdown produces nine observations, with an average excess return in favor of the MinVar of 1.1%, and a hit rate of eight to one. **There are many ways to skin this cat, but these results suggest that the relative performance of the MinVar is a positive function of volatility, which is exactly what I hoped for.** In the current environment, I reckon this is a portfolio-feature that investors would want to pay for.

fig. 07 / The Tangent portfolio in real life - **fig. 08** / ...and its MinVar counterpart

— ETF 60/40 Growth tangent portfolio*, 2016=100 (Left)
— 60/40 Growth tangent portfolio, 2010=100 (Right)

Correlation (weekly observations since Jan 2016):
Level: 0.97
In changes: 0.83

* 41.2% in a U.S. 10-year total return series, and 58.8% in VMOM ln equity.

— ETF MinVar portfolio*, 2016=100 (Left)
— MinVar portfolio, 2010=100 (Right)

Correlation (weekly observations since Jan 2016):
Level: 0.95
In changes: 0.88

* 54.3% in a U.S. 10-year total return series, 15.5% in VMOM ln equity and 30.2% in VVAL ln equity.

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To complete my analysis, I tried to see how easy it would be to move from theory to practice, in effect trying to replicate the Growth Tangent and MinVar portfolios with ETs, focusing on mimicking the equity legs. I have had to change the base year for the ETF portfolios, because the history doesn't stretch back to 2010. In this case, Vanguard listed the two funds in 2015.

The two charts above shows that I get reasonably close by using Vanguard's Momentum and Value ETFs—listed in the U.K.—though in the case of the MinVar, it seems like the 'tracking error' has increased since mid-2019, leading to underperformance of the ETF portfolio relative to the theoretical model. The logical explanation is that the U.S. value factor is now outperforming the global value factor, though I have not verified this quantitatively. **In any case, a correlation coefficient of +0.8 with weekly returns denotes a robust relationship. I doubt that you can do much better, though I am happily proven wrong.**

As far as the bond leg goes, it should be fairly simple to replicate. Just remember that government bond ETFs tend to come in two forms, accumulators and distributors. The former is the one you need if you want to replicate a total return series.

Finally, there is the question of rebalancing, which is really a topic for a separate essay. The simple rule of thumb is to rebalance at the same rate at which your model updates. In the case of the analysis here, that would suggest rebalancing on a quarterly basis. This makes sense insofar goes that this is actually possible for a retail investor. The downside of a model with quarterly returns, and rebalancing, is that it will be very slow in picking up underlying shifts, that would be picked up by a model with monthly, weekly or perhaps even daily returns. The problem is that rebalancing your portfolio on a weekly or daily basis is impossible for practical purposes. Even monthly rebalancing can be practically difficult, due to transaction costs.

Another element is the length on the return series. In my model, for example, what happened in 2011 enters with the same weight as what happened in 2019, which seems unreasonable. There are ways to correct for this via separate dynamic rebalancing models, and overlays, but I won't go into this here. *The key point is that whether you are a retail investor managing your pension, or a multi–billion–dollar PM, the correct rebalancing strategy effectively involves resolving a tradeoff between accuracy and transaction costs.*

ALL HAIL VALUE EQUITIES?

The quantitative study above holds two key messagea for investors. Firstly, it shows how easy it is to justify why a 60/40 portfolio, with an equity leg in growth stocks, is the optimal strategy most for most investors. Secondly, it then proceeds to qualify this conclusion by asking why investors would want to hold both long-term government bonds and growth stocks, given that the latter is a levered bet on the former.

The resulting focus on the MinVar portfolio resolves two main challenges for investors, at least in theory. It shows how focusing on the asset allocation that minimizes volatility actually produces a higher, albeit slightly, risk-adjusted return than the 60/40 growth selection. More importantly, it also produces a portfolio which seems to be consistently more resilient to bouts of volatility. This is an important result. **In a world where holding the market produces consistently above-par returns, holding a portfolio that provides relative protection against increasingly unpredictable bursts of volatility would seem to be a winning hand.** It is even more attractive assuming that such a portfolio would also outperform in the context of a regime change, characterized mainly by rising long-term interest rates. That said, this particular characteristic is a hypothesis.

Stretching this argument, it is plausible to assume that the MinVar portfolio offers a call option on the parts of the market that has been consistently underperforming, at the same time as staying in the game. If that is not a strong case for value equities, I am not sure what is.